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Devoted to Steam and Electric Railway, Marine, Grain Elevator, Express, Telegraph,
Telephone and Contractors' interests

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See page 377.

Grade Separation.

By W. H. Breithaupt, M. Can. Soc. C.E.

Two bodies cannot occupy the same space. Of two intersecting lines of traffic on the same plane neither can be continuous; each must be intermittent, must stop, or change direction, while the other passes. And while each line may be naturally intermittent, may consist of detached units, if its units pass at variable and unrelated intervals, liability for two units, one on each line, to meet at the point of intersection remains unchecked. If either line is fixed in direction, as on a railway, and cannot turn aside, the danger of interference increases; and increases more if both lines are so fixed. The fact that the only safe crossing of street or highway and railway, or of railway and railway, is in placing one above the other, and thus giving each a free and unobstructed course, is an axiom. No so-called protected crossing—a grade crossing with gates, signals, derails and other appliances, or any of them, operated by attendants, or automatically—has been found to be ultimately safe. Separation of grades has in addition to safety, the further great advantage of elimination of delay and of maintenance and operating cost. This paper aims to give existing conditions governing the practicability of grade separation. The physical laws for grade separation are summed up in two:

1. The structure carrying the upper line of traffic must be sufficiently high above the lower traffic way to clear all objects passing on the latter.

2. The grade on either traffic way, approaching the crossing, must be practicable for the traffic thereon.

The maximum height of loaded vehicles and any objects thereon on city streets or country highways has been accepted as 14 ft. This height is also sufficient to clear regular street railway traffic. While higher objects are moved along roads occasionally, it is properly not considered necessary to endanger the practicability of crossings under railways to accommodate them. With the railway on moderate embankment, undercrossings of roads, subways as they are called, become readily practicable. In many cases it is possible to sufficiently change the grade both of railway and road to meet requirements for a subway. Sometimes a deviation of the road, or change of location for a short distance, is practicable, and greatly simplifies the desired grade separation.

The vertical clearance, top of rail to bridge, required over railway tracks is in most cases much higher than over roads,

and this constitutes, in the great majority of cases, the insurmountable obstacle to grade separation. The highest fixed projection on an ordinary railway train is the locomotive smoke stack, and passenger cars project higher than the great bulk of freight cars; but some, comparatively extremely few, special freight cars are higher than either passenger cars or locomotive stacks. The extreme clearance requirement is for height, top of rail to running board, of highest car, height of brakeman added thereto, and a further allowance for contingencies, among which may be height of load of light material on an open car

less than 1% higher than 14 ft. Considering main trunk lines, the Pennsylvania Rd., Baltimore and Ohio, Erie, Lehigh Valley, Great Northern, and a number of others, i.e., as far as known, with a small percentage of cars having dimensions not ascertained, among the latter the Grand Trunk and Canadian Pacific Railways, have either none or less than ¼ of 1% of freight cars over 13½ ft. to running board.

The M.C.B. Association, whose standards are adopted by railways on the North American continent and are recognized by the Board of Railway Commissioners for Canada, has not fixed a standard for box car dimensions, but adopted in 1904, as recommended practice, a height of 12 ft. ¾ in. to eaves, equivalent to less than 13 ft. height to running board. High standard cars are such as the G.T. Pacific series 300000—310824, 13 ft. 4 in., and the C.P.R. new steel frame box car series 130000—132998, 13 ft. 4¾ in. The highest regular C.P.R. freight cars are 13½ ft. to running board and this may be said of most of the main trunk lines of railways. The highest Pennsylvania Railroad freight cars are 13 ft. 4 in.

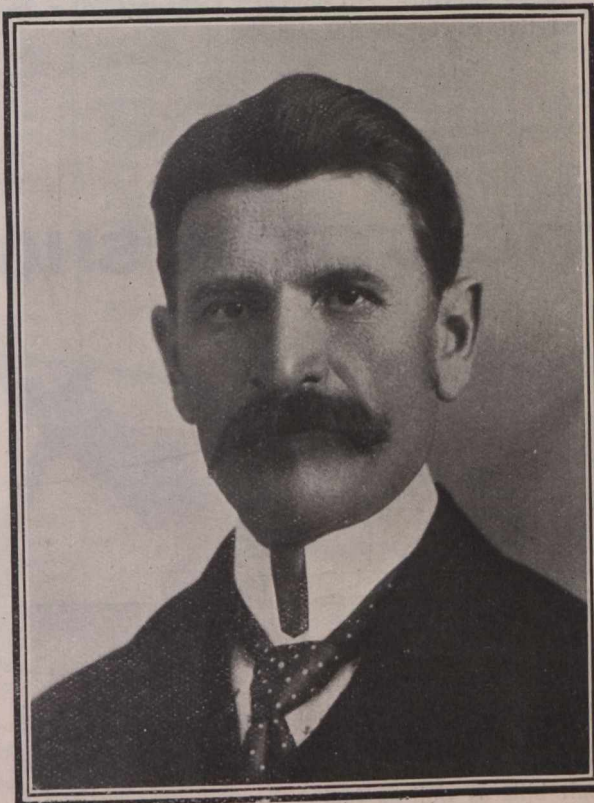
Limits of car dimensions are fixed by clearance outlines on the various railways. A composite clearance limit diagram for 90 railways, including all Canadian trunk lines, has a height of 14½ ft., limiting "over all" height of cars to this figure and practically limiting height of top of running board of freight cars to 14 ft. In the G.T.R. St. Clair tunnel, the clearance height at width of 3 ft. is 14 ft. It is true that on many divisions or branches of the lines considered, the clearance is somewhat greater than shown in the composite diagram referred to, while on the other hand, it is less on a number of main lines, and on many branch lines. An empty freight car 14 ft. high will on 5 ft. (out to out of rails) transverse base not resist a 30 lb. wind pressure when standing alone.

The limit of grade, approaching crossings, can for railways be taken as between 0.5 of 1% and 1%. For city streets a grade of 5% is in most cases extreme and it should be so for main country highways. A preferable maximum grade for roads is 4%, and 3% is materially better. This works out as follows:

Five per cent. grade 20x2=40 ft. length of approaches for every vertical foot of clearance.

Four per cent. grade 25 x 2=50 ft. length of approaches for every vertical foot of clearance.

Three per cent. grade 33 ft. 4 in. x 2=66 ft. 8 in. length of approaches for every vertical foot of clearance.



M. S. BLAIKLOCK

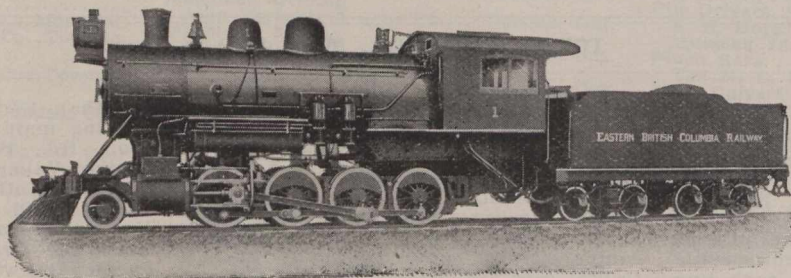
Engineer Maintenance of Way, Grand Trunk Ry.

exceeding maximum box car height. There are on the railways of standard gauge in the United States, Canada, and Mexico, about 2,377,282 freight cars of all kinds. They classify as to height, rail to running board, as follows:

Under 12 ft. including flat, gondola, and tank cars	63.1 per cent.
12 ft. to 13 ft.	23.4 " "
13 ft. to 13 ft. 6 in. inclusive	11.9 " "
13 ft. 6 in. to 14 ft. inclusive	0.65 " "
Over 14 ft.	0.95 " "

Of the total number of freight cars 98.4% are 13½ ft. high or under, and only 1.6% are higher than 13½ ft.; and Canada, has not fixed a standard for box

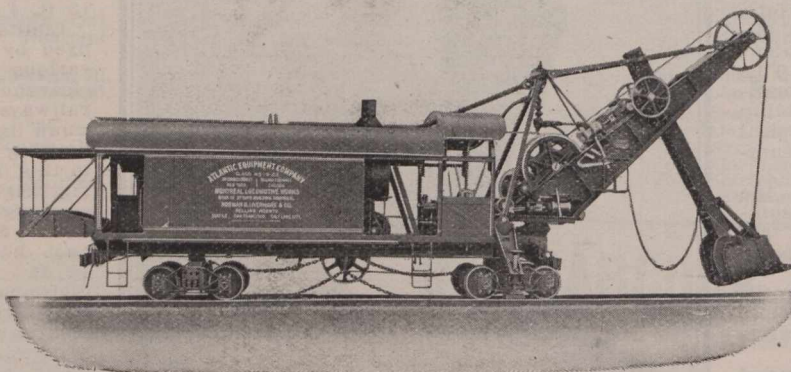
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Consolidation Type Freight Locomotive, Built for Eastern British Columbia Railway.

Total weight of engine in working order, 186,310 pounds. Weight on driving wheels, 166,100 pounds. Diameter of driving wheels, 51 inches. Boiler pressure, 210 pounds. Cylinders, 20 x 28 inches. Maximum tractive power, 39,200 pounds.

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Direct wire rope hoist with but one sheave, instead of chain hoist with from five to seven sheaves, reduces delays and loss of time due to breakdowns, increases the efficiency of the engines, and reduces repair bills as well as fuel consumption.

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Any gain, by curtailment of vertical clearance requirement, or by change of railway grade, or by both, means corresponding shortening of road approaches, at the high ends. Such a gain of 1 ft. may greatly reduce the cost of a given grade separation, making it practicable when it would not otherwise be so. A vertical gain of 2 ft. would mean a very large addition to the number of practicable grade separations.

The extreme allowance that should be made for brakemen on a car must not exceed 7 ft.; $6\frac{1}{2}$ will clear any brakeman unless he should be over 6 ft. tall, and 6 ft. brakemen are not common, to say the least. What is to be said for the contention, seriously made, that the brakeman on the running board of highest known car, should be allowed room to swing his lantern over his head? The necessity for brakemen on the tops of cars is becoming less and less, and has in many cases disappeared, rules and regulations of railway companies to the contrary notwithstanding. The air brake is now universally used in train control. In Canada the orders of the Board of Railway Commissioners, in force since Dec., 1908, provide that no regular freight train shall be allowed to proceed on its journey unless at least three-quarters of the cars comprising it are equipped with air brakes in good working order; also that every freight car built shall be equipped with air brakes and with operating levers on both sides of the end.

A stage is reached in the traffic of railways when grade crossings become intolerable, and when the risk and interruption due to them becomes more expensive than their elimination. In Europe, grade crossings, in any considerable centres of population are the exception, and this may soon be said also of main trunk line railways in the older parts of the United States. The Pennsylvania Rd. makes it a rule to avoid all grade crossings on new work, and has within the last nine or ten years eliminated over 50% of all its grade crossings on main lines. To do this clearance must be made as low as possible. Overhead bridges are as low as $16\frac{1}{2}$ ft. above top of rail, while many are $18\frac{1}{2}$ ft. and less. Twenty-one ft., the standard for signal bridges, is recognized as the highest clearance for which there can be any need. In New York State many overhead bridges are only 18 ft. above the top of rail, and this is the case also in Massachusetts and in other states. The New York Central and H.R. Rd. has asked for 16 ft. or $16\frac{1}{2}$ ft. clearance for all overhead bridges within the electric zone, extending 16 miles from the Grand Central Station, New York.

Electric traction within limits for such large centres of traffic as Montreal and Toronto, with hydro-electric energy, abundant or soon to be, is easily within the range of probability in the not distant future. Smoke abatement alone points in this direction. The vexed question of grade separation would at once assume an entirely different aspect if these conditions were accompanied by a cutting down of the vertical clearance requirements to 17 ft. or even to 18 ft.

It is submitted that with conditions as they are and more so with regard to the future, 20 ft. ($13\frac{1}{2}$ ft. for car and $6\frac{1}{2}$ ft. for man), is a reasonable vertical clearance. It has been shown that $13\frac{1}{2}$ ft. covers the height to running board of all but a very small percentage of freight cars now in use, and that cars higher than 14 ft. to running board, i.e., higher than $14\frac{1}{2}$ ft. over all, or to top of brake rod, can only to a limited extent traverse beyond their home railways. That higher cars will be economical or practicable is as little probable as that the gauge of railways will be widened or their entire structure changed. For a

vertical clearance requirement greater than 21 ft. (14 ft. plus 7 ft), there can, in any event, be no conceivable rational need.

In the United States there is no federal law fixing vertical clearance for bridges over railways. A number of states deal with the question. In Massachusetts there is a special Grade Crossing Commission. The minimum clearance required by this Commission is in general 18 ft. Connecticut and Rhode Island also specify 18 ft. In New York the Public Service Commission has charge of grade crossing regulations. While this Commission requires 21 ft. clearance where practicable, many lower bridges are built throughout the state, some, as already stated, are as low as $16\frac{1}{2}$ ft. New Hampshire, Ohio, and Indiana require 21 ft. The only states requiring more are Illinois and Vermont, where 22 ft. is specified, but exception is made where this height is not practicable. In all other States there

A General Superintendent's Opinion.

Alfred Price, General Superintendent Western Division, Canadian Pacific Ry., is well known in Eastern Canada, the scene of his earlier activities, as he is also in Western Canada, where for the last seven years he has occupied prominent positions in the company's service. He has had a most valuable all round experience as messenger, operator, car accountant, train dispatcher, car distributor, chief train dispatcher, superintendent, Superintendent of Transportation and General Superintendent, and is consequently in a position to speak with authority on railway matters. We therefore specially value the following which he favoured us with a short time ago:—

Canadian Pacific Railway.

General Superintendent's Office, Calgary, Alta., Oct. 21, 1909.

To a railroader who desires to keep in touch with current railway news and alive to the railway development of our country, I consider it essential that he read the Railway and Marine World. Its distinguishing characteristic is its reliability.

A. PRICE.

That Mr. Price's opinion of our paper is shared by railway men generally is shown by its thorough circulation among all classes of them throughout every province of the Dominion and in Newfoundland. What Mr. Price describes as "its distinguishing characteristic, its reliability," has caused it to be absolutely relied on, and as a consequence it is thoroughly read by its subscribers, and is of correspondingly value to its advertisers.

is no statute or regulation, as far as has been ascertained, and heights of overhead bridges vary from 16 or 18 ft. to 22 ft.

In Canada the Dominion Railway Act of 1904 specifies a minimum clearance of $22\frac{1}{2}$ ft. above rail top for bridges over railways, with no deviation except by leave of the Board of Railway Commissioners; and this board has hitherto not allowed a deviation in any case.

The foregoing paper was read before the Canadian Society of Civil Engineers recently.

The Temiskaming and Northern Ontario Ry. Commission has decided to send engineers to make a thorough examination and test of the lignite beds discovered on the projected route of the line north from Cochrane, Ont.

May Birthdays.

Many happy returns of the day to—

W. R. Baker, Secretary and Assistant to President C.P.R., Montreal, born at York, Eng., May 25, 1852.

G. S. Cantlie, General Superintendent Car Service C.P.R., Montreal, born there May 2, 1867.

M. Donaldson, Superintendent Ottawa Division G.T.R., Ottawa, Ont., born near Edinburgh, Scotland, May 1, 1851.

G. C. Dunn, District Engineer G.T.P.R., Winnipeg, born at Quebec, May 13, 1862.

J. D. Evans, Chief Engineer Central Ontario Railway, Trenton, Ont., born at Goderich, Ont., May 27, 1843.

E. T. Galt, President Alberta Railway and Irrigation Co., Montreal, born at Sherbrooke, Que., May 24, 1850.

C. M. Hays, President G.T.R., and G.T.P.R., Montreal, born at Rock Island, Ill., May 16, 1856.

G. H. Hedge, Assistant Master Mechanic C.N.R., Winnipeg, born at Neath, Wales, May 26, 1865.

R. B. Hepburn, President and General Manager Ontario and Quebec Navigation Co., Picton, Ont., born there May 27, 1876.

W. T. Huggan, Accountant and Auditor, Prince Edward Island Railway, Charlottetown, P.E.I., born at Halifax, N.S., May 24, 1851.

W. S. Kinnear, Assistant General Manager Michigan Central Rd., and Chief Engineer Detroit River Tunnel, Detroit, Mich., born at Circleville, Ohio, May 25, 1864.

W. Marshall, Superintendent C.P.R. Telegraphs, Ontario Division, Toronto, born at Garden Island, Ont., May 18, 1859.

M. Neilson, C.E., Consulting Engineer, Montreal Street Railway, born at Almonte, Ont., May 26, 1852.

A. L. Ogilvy, General Purchasing Agent, National Transcontinental Railway Commission, Ottawa, Ont., born at Richwood, Oxford County, Ont., May 23, 1868.

Hayter Reed, Manager-in-Chief C.P.R. hotels, Montreal, born at L'Orignal, Ont., May 26, 1849.

H. B. Sherwood, Superintendent Bay of Quinte Railway, Napanee, Ont., born at Auburn, N.Y., May 25, 1847.

E. Tiffin, Member Government Railways Managing Board and General Traffic Manager I.C.R., Moncton, N.B., born at Hamilton, Ont., May 5, 1849.

J. H. Walsh, General Manager Quebec Central Railway, Sherbrooke, Que., born at Quebec, May 12, 1860.

H. K. Wicksteed, Chief Engineer of Location, Mackenzie, Mann & Co., Ltd., Toronto, born at Quebec, May 25, 1855.

James Yeo, ex-Roadmaster Intercolonial Railway, Riviere du Loup, Que., born at Bideford, Devonshire, Eng., May 1, 1830.

Railway Subsidy Lands in British Columbia.

—Under an act passed last session of the British Columbia Legislature, the Government is authorized to enter into conditional agreements to acquire for the province by purchase, exchange or otherwise, any lands granted by it in aid of the construction of railways, and to pay the whole or part of the purchase price of such lands by the issue to the vendor of inscribed stock of the province, or otherwise. All lands acquired under the act shall, after their acquisition, be subject to the provisions of the Land Act. No agreement is to take effect until it has been ratified by the Legislature.

The G.T.R. started running through trains from Montreal to Manitoba, Saskatchewan and Alberta, running over the company's own lines to Chicago, Ill.; thence by U.S. connections to Winnipeg, and from there over the G.T.P.R.

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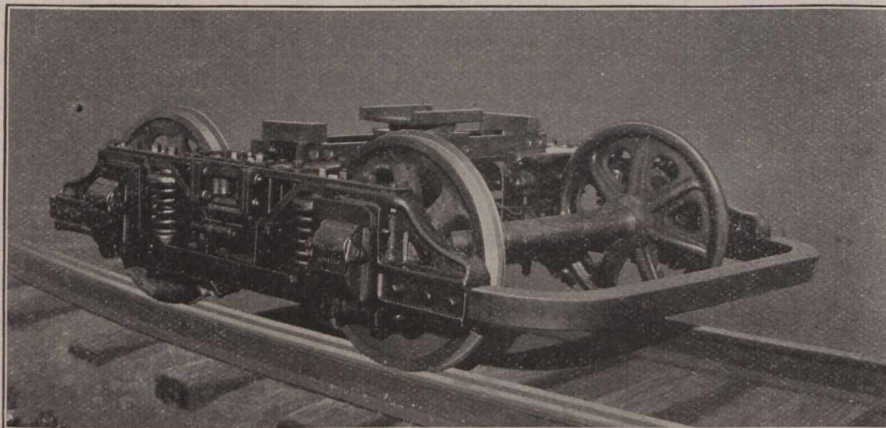
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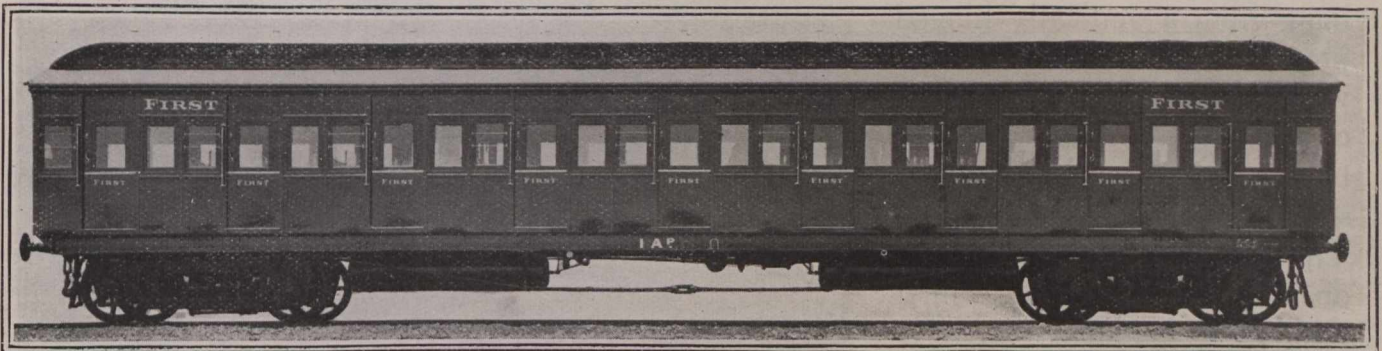
The Tait Suburban Car.

A very large traffic is dealt with by the Victorian Railways Commissioners on their suburban lines at Melbourne, Australia. The number of suburban passengers carried on these lines during the year ended June 30, 1909, was 74,541,251, and the revenue derived therefrom £746,844. About 1,300 suburban trains and 150,000 passengers arrive and leave the central passenger terminal every day. When Thos. Tait, Chairman of the Victorian Railways Commissioners and formerly of the C.P.R. service, was in Europe and America three years ago he inspected various types of suburban carriages then in use, including those which had just been constructed for service on the Hamburg-Altona line and the suburban cars running on the Illinois Central Ry. at Chicago, and as a result of his observations the car, of which illustrations are given in this issue has been designed to meet the requirements of the Melbourne suburban traffic.

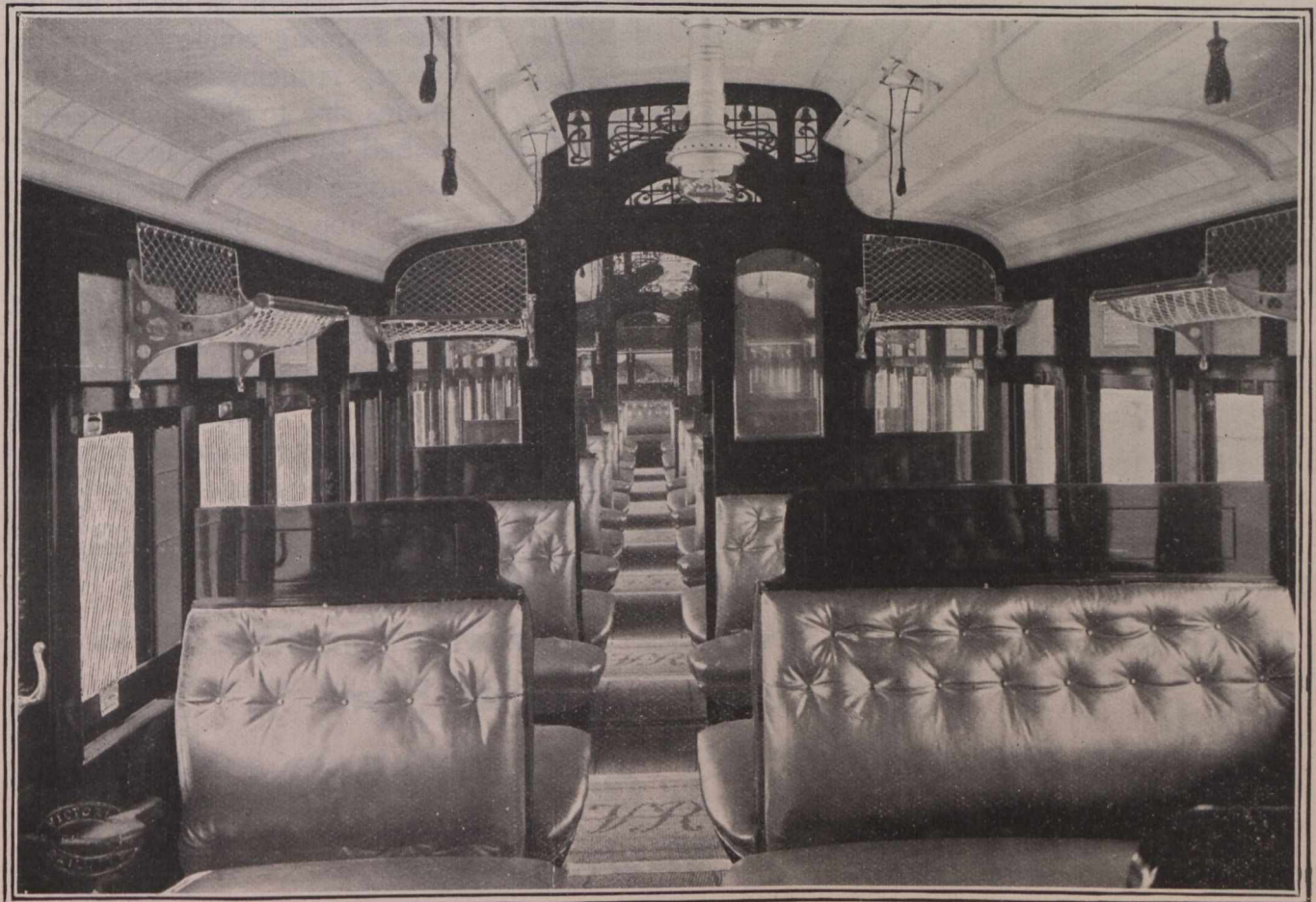
The most notable departures in this car

from the suburban carriage hitherto in use at Melbourne, which is of the ordinary cross-compartment non-corridor type with swinging doors for each compartment, are the provision of a passage-way and the substitution of sliding doors for the swinging doors. The object of the passage-way is to permit of passengers distributing themselves through the car, thus obviating what frequently happens in the cars hitherto used, viz., overcrowding in one compartment when there may be vacant seats in other compartments. In order that the seating accommodation would not be diminished by the provision of this passage-way the cars have been made about a foot wider and this has necessitated the use of sliding doors as there would not be sufficient clearance of other trains on double tracks or of structures if swinging doors were used. Apart from this consideration, however, sliding doors are considered to be an advantage as they will do away with the noise and danger and some of the expense now contingent on the opening and closing of swinging doors, but, what is more im-

portant—in the event of the electrification of the Melbourne suburban lines—one of the principal advantages of electric traction, viz., the possible quick acceleration from stations will not be lost owing to trains having to be started slowly to permit of the swinging doors being closed and fastened. In this connection it may be mentioned that it is intended that passengers shall open and close the sliding doors themselves and that this will permit of some reduction in the station platform staff being effected. It may also be mentioned that, apart from the locomotive driver and fireman, only one man—a guard who travels in the compartment provided for the purpose at the extreme rear end of the train—is employed on the Melbourne suburban trains. The provisions of a passage-way and of a door on each side of the car for each pair of seats combines the advantage of the American car or of a corridor car in enabling passengers to distribute themselves to the best advantage throughout the car with the advantage of quick ingress and egress of passengers afforded by the



Exterior of the Tait Suburban Car.



Interior of the Tait Suburban Car, First Class.

Results Are What Count

A Combined Skidding and Loading Machine that will clear up the largest area at a setting and can be moved and set up ready for business in the shortest possible time will get the best results

The latest Russel Machine has some distinct improvements that save time and trouble, consequently money. Note the new method of suspending the skidding sheaves. They are hung from a vertically hinged jib or triangle the outer end of which is guyed by two lines, one on each side, which are power tightened and can be set while skidding lines are going out. The guy lines lead back so they do not interfere with either skidding or loading.



The uppermost leg of the jib has a spring connection to the tower, reducing shocks. All strains due to skidding are absorbed by the guy lines. The swinging boom is operated by wire ropes passing through sheaves suspended from a steel frame projecting from the tower and leading to two drums on loading engine, controlled by one lever. Machine is raised or lowered by hydraulic or patented geared jacks.

Built for 2 or 4 lines with stiff or swinging boom. Constructed entirely of steel, except loading boom.

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LOGGING CARS AND DUMP CARS

RUSSEL WHEEL & FOUNDRY CO.

Detroit, Mich., U.S.A.



Train of Tait Suburban Cars on the Victorian Railways.

European ordinary cross compartment car with side doors for each compartment.

The new cars are 57 ft. 4½ in. long over the bodies and are divided into three large compartments, separated by partitions fitted with sliding doors and glass panels so that passengers can see from one compartment into the other. These partitions will prevent too much draught through the car and will provide sub-divisions as required for smokers, etc. Each car will comfortably seat 92 passengers, two on each seat on one side of the passage-way, three on each seat on the other side, and six on the seat at each end of the car, and in emergencies many more passengers can find reasonable seating and better standing accommodation than in the existing carriages. A feature of these cars is that being a foot wider, which brings them to the full width of the footboards of the cars hitherto used and in line approximately with the nosing of the platforms, and the floors being designedly low, no footboards will be required, and there will be only one step—of about 10 ins.—between the car floor and the station platform. The end of the guard's van compartment has been made elliptical in shape, with a view to it being used as a motor compartment in the event of electrification, and a wide landing for the guard has been provided in the doorway of this compartment. It has not been considered advisable to provide moveable sashes at those windows past which the doors slide owing to the possibility of injury to passengers' arms or hands in the event of the doors being incautiously opened, but ample provision has been made for ventilation.

Steel has been used largely in the construction of the bodies, and the underframes and bogies are entirely of steel. The whole of the external panelling is of steel and the interior ceilings and panels are of embossed steel of Australian manufacture suitably painted and grained. The body framing and pillars are of teak, and Australian cedar and maple have been used in the linings, mouldings, etc., of the interior. The seats are upholstered in Australian green leather. In the design and finish of the interior all sharp angles and corners or other re-

ceptacles for dust and dirt have been avoided. The lighting is by Pintsch gas with incandescent mantles. Although steel has been used so largely and the cars are a foot wider they will not weigh as much per passenger seat as the suburban cars of the same length hitherto used.

The extreme ends of each carriage are furnished with large sepia toned bromide photographs illustrating various Victorian tourist resorts. A complete train of these cars was put into service on one of the Melbourne suburban lines on Jan. 6 and has met with the general approbation of both the public and the railway staff. With the exception of a few minor alterations, which experience of these cars may show to be advisable, the Commissioners will probably adopt the Tait car for their entire Melbourne suburban service.

C. P. R. Irrigation Work.

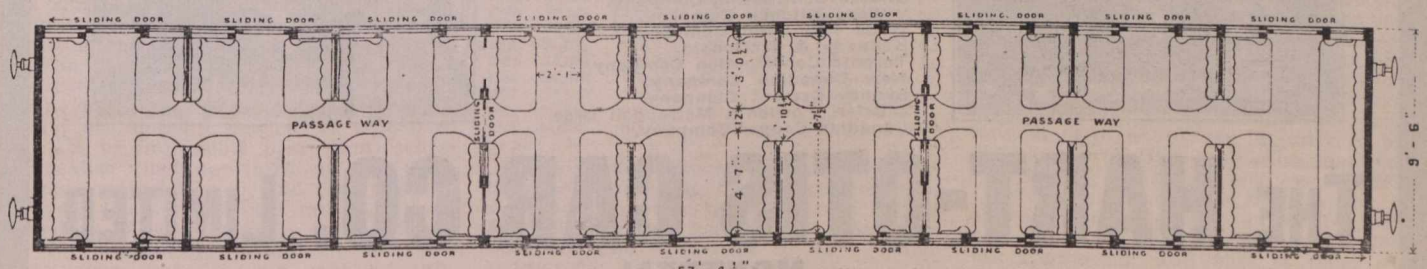
In connection with the development of the C.P.R. irrigation block in the Bow River Valley, Alta., we are officially advised that the construction work for the current year will include about 300 miles of canals and ditches, which will bring the total mileage of canals and ditches on the western section of the block to 1,600 miles. The construction of the 300 miles will involve the moving of about 1,250,000 cubic yards of material, and the placing in position of 1,750,000 ft. of timber and 2,000 cubic yards of concrete. In this section there has been opened for traffic a branch railway from Langdon northerly for about 40 miles to Acme, and during the current year it is proposed to build a 15 mile branch line east from Irricana through the 3,000,000 acre block. It is also proposed to add 50 miles to the telephone lines in the western section, and to carry the line through the central and eastern sections of the block, a distance of 127 miles.

The plans for the development of the central and eastern sections of the block as now completed contemplates the construction of 1,000 miles of canals and ditches in the central section, and 3,500 miles in the eastern section, at an estimated cost of about \$12,000,000. The work to be immediately undertaken is the

development of the eastern section, for which it is expected that contracts will be let at an early date. The construction of these 3,500 miles of waterways will involve the movement of 28,000,000 cubic yards of material. During the current year 250 men will be employed upon the engineering staff in connection with the work, all of which is being carried on under the direction of J. S. Dennis, Calgary, Assistant to the Second Vice President.

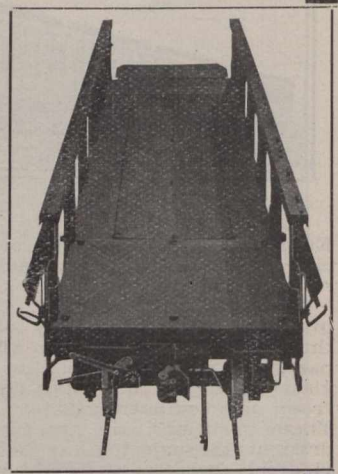
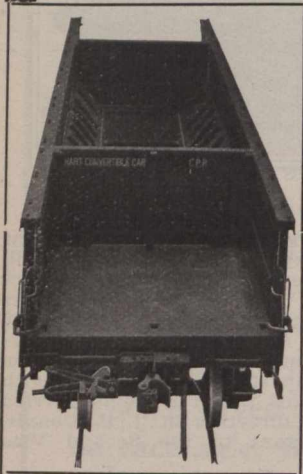
Dynamos and Motors.—This is the title of a text book for use in colleges and technical schools, by W. S. Franklin, Professor of Physics at Lehigh University, and W. Esty, Professor of Electrified Engineering at Lehigh University, published at \$4 by the Macmillan Co., 66 Fifth Avenue, New York. It was written to meet the demand for a simple physical treatise on dynamo electric machinery, apart from such subjects as electrical distribution and wiring and electric lighting. In the first part the authors deal with the electric current, the dynamo and transformer, direct current and alternating current measurements; in the second, with the operation of a direct-current dynamo as a generator, the operation of a direct-current dynamo as a motor, power losses and efficiencies, ratings and guarantees; in the third with harmonic electromotive forces and currents, fundamental problems, the poly-phase system; in the fourth with the alternator as a generator, the synchronous motor, the synchronous converter, the simple theory of the transformer, the induction motor, the single-phase series motor; and, in the fifth, with switchboards and switchboard appliances, and the practical operation of dynamos. An appendix sets out a series of 188 problems on the different chapters, with the answers. The work is primarily a text book adapted for the requirements of the student, and aims to give him a good basis of theory as well as a practical conception of the direct and alternating current dynamos and motors.

The C.P.R., which has received several complaints as to freight going astray, or being delayed, on its western lines, has issued rules for the guidance of shippers, as to the marking of packages.

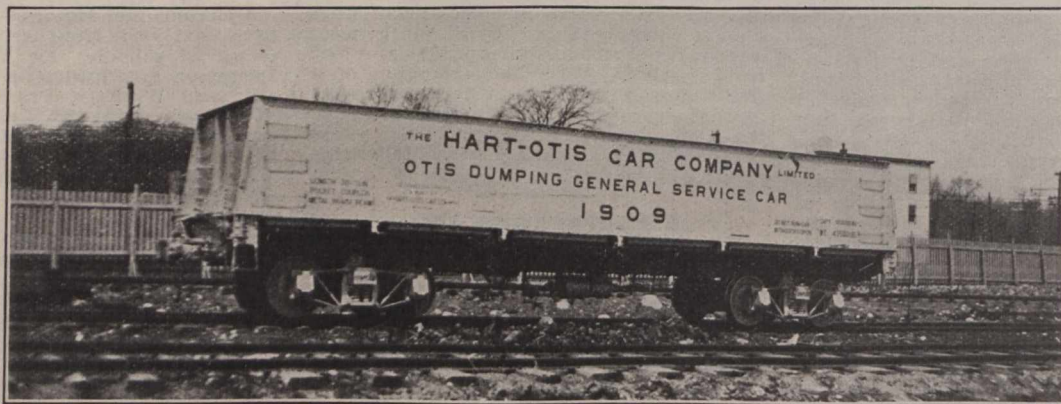


Floor plan of the Tait Suburban Car.

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HART CONVERTIBLE CARS
OTIS DUMPING GONDOLAS



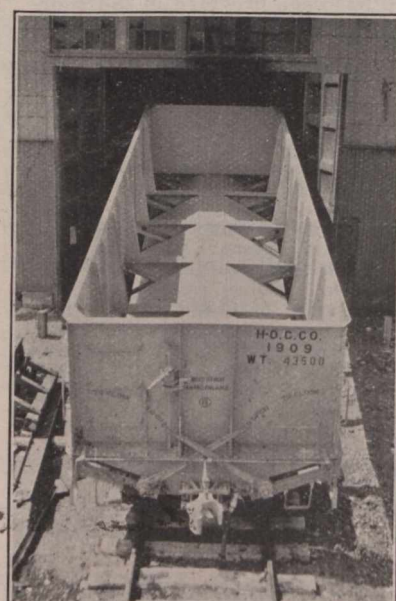
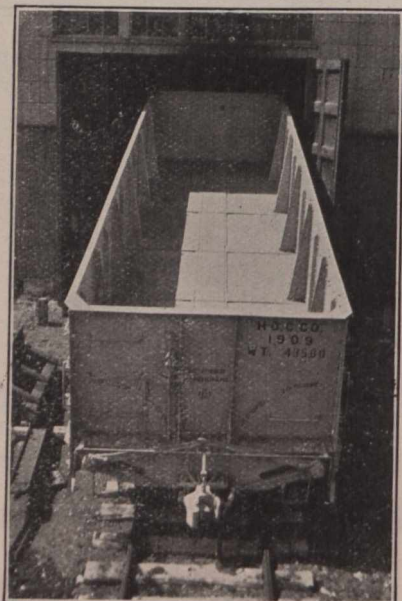
HART CONVERTIBLE CARS
 Steel or Wood Construction, 30 to 50 Tons Capacity



OTIS DUMP CARS
 Steel or Wood 40 Tons Capacity

ABOVE CAR USED BY THE FOLLOWING:

- Canadian Pacific Railway.
- Grand Trunk Pacific Railway.
- Grand Trunk Railway.
- Canadian Northern Railway.
- Canadian Northern Ontario Railway.
- Canadian Northern Quebec Railway.
- Intercolonial Railway.
- Temiskaming & Northern Ontario Ry.
- Central Ontario Railway.
- Quebec Central Railway.
- British Columbia Electric Railway.
- Esquimalt & Nanaimo Railway.
- Mount McKay & Kakabeka Falls Ry.
- Atlantic, Quebec & Western Ry.
- City of Winnipeg.
- J. D. McArthur Company.
- Macdonell & O'Brien.
- M. P. & J. T. Davis.
- Corbett, Fioesch & Company.
- E. F. & G. E. Fauquier.
- Mackenzie, Mann & Company.
- Pacific Coast Coal Mines, Limited.
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Efficiency in Transportation.

By D. Crombie, Assistant to General Transportation Manager, G.T.R.

This subject covers a wide field, too large to be handled in one paper, consequently, comment will be made at this time only on certain aspects which have, through a closer experience, more forcibly appealed to me, viz., car service, fast freight service, train loading, fuel, and station service.

Efficiency and economy are naturally and intimately related, since, to quote the dictionary, efficiency is, mechanically speaking, "the ratio of work performed to the energy expended," while economy concerns "a frugal and judicious use of materials." From either point of view, the results must correspond to the expenditure. Efficiency is not an extravagant perfection, nor is economy served by parsimony.

Due to the tremendous development of transportation the transportation officer has been expected and forced to produce results with but limited means, since the capital account expenditure could not expand as promptly as did the volume of traffic. We have been compelled, then, to "a frugal and judicious use of materials," and have accomplished "a ratio of work performed to the energy expended," which, compared with the results in other countries, speaks well for our efficiency. It it were not so, our executive officers would not meet with such a measure of success in tapping those reservoirs of capital which lie across the sea.

When we consider that the freight rate per ton per mile in Great Britain (2.31c.) is three times our rate (¾ of a cent), and in Germany the revenue per ton per mile (1.41c.) is almost twice our revenue; and when we consider that out of our lower rate per mile we pay to our employes wages, per man, 82% greater than in Germany, and 140% greater than in England; when we consider, further, the density of their traffic per track mile as compared with ours; and yet that, with all this, the ratio of our expenses to earnings (67.5%) is less than in Germany (69.1%) and but little greater than that of Great Britain (63%), it must be granted that we have in comparison reached a high degree of efficiency. Presumably it does not occur to the complainant who addresses the Board of Railway Commissioners, alleging excessive freight rates, that the average ton of freight handled by a railroad is moved 33 miles for the same cost per ton that this individual pays his coal dealer to transport a ton of coal across his lawn. This is an illustration which has been much used, but bears repeating.

On the other hand, when the Interstate Commerce Commission statistics for 1908 show that the average carload is but 19 tons, while the average capacity of freight cars is 34 tons; that the average movement per car per day is but 23.5 miles, and that 30% of these movements are empty, or, in car service as a whole, an efficiency of but 4% of the impossible perfection; when statistics show that the tractive power of the average engine is 27,500 lbs., while the rolling resistance of the revenue freight behind the engine on a 1% grade at 10 miles per hour is but 8,746 lbs., and on the level is only 1,606 lbs., and that the average train movement of each engine in freight service is but 57 miles a day, or, in train service, an efficiency of 1.4% of impossible perfection; when we realize that one-third of the total tonnage moved is coal, and that one out of every five tons of coal mined is consumed in railway engines, and that—as H. H. Vaughan has explained in a recent paper—but 5% per cent. of this coal is transformed into useful work;

when we consider that on some railways as much as 3% of the gross freight earnings is paid back to the shippers in settlement of claims for loss and damage, we must, as transportation officers, confess to a need of continued endeavor. These figures are somewhat startling, but they sound considerably worse than they really are. They require analysis.

The strict enforcement of demurrage rules, with a view to decreasing, as far as possible, the shippers' delays, and the advocacy of a high per diem rate of car rental to stimulate the railway to prompt car movement, have, in the anticipated results, both been over-estimated. The chief controlling factors in the average movement per car per day are the distance the tonnage moves from originating point to destination, and the necessary free time allowances for loading and unloading. The average distance freight shipments are moved on all railways is 131.7 miles; the average mileage per car per day is 23.5 miles, or 5.6 days per trip.

How is this time consumed? Almost all of it in "shipper's detentions." For example, the National Association of Car Service Managers report that the average detention by consignor and consignee is 1.68 days at each end, and the railway detention, after arrival of car at destination and before same is placed on the unloading track, is .31 days. But in car demurrage calculations the free time detentions account of Sundays, legal holidays, Customs and weather are not taken to account, and this is in excess of 60 days in each year, or ¼ of the total car days. Further, as cars placed between 7 a.m. and 11 a.m. are in accordance with demurrage rules considered as though placed at 1 p.m., and cars placed after 11 a.m. are considered as placed at 7 a.m., it follows that there is an average of at least a quarter of a day omitted in the calculations owing to the difference between the actual placing and this constructive placing.

The complement of time then actually necessary in the handling of one shipment may be considered to be:

	Days.
Loading time (consignees' detention)	1.68
Add ¼ day difference between actual and constructive placing . . . . .	.25
In transit 131.7 miles at 10 miles per hour . . . . .	.35
Advising and switching time (railway detention) . . . . .	.31
Unloading time (consignees' detention)	1.68
Add ¼ day (as above) . . . . .	.25
	4.72
Add ¼ of complete trip time account elimination of Sundays, holidays, etc. . . . .	.78
Total time accounted for or explained, as above	5.50
Out of a total average time on each trip of	5.60

It has seldom been shown, and it will be interesting to note, the history of car performance for the past 36 years:

Year	Total Ton Miles Moved (Millions)	Total Frt. Cars	Ton Miles per Car per Day	Miles per Car per Day	Tons per Car Mile	Avg Length of Tons Haul in Miles	Days per Trip
1907	296,601	1,901,557	328.2	23.5	13.9	131.7	5.6
1905	186,463	1,731,409	295.0	23.9	12.3	130.6	5.5
1902	157,289	1,546,101	278.7	23.6	11.8	131.0	5.5
1899	123,667	1,295,510	291.5	24.7	10.6	131.0	5.3
1896	95,328	1,221,887	213.7	22.4	9.5	124.5	5.5
1893	93,588	1,201,645	213.4	25.1	8.5	125.6	5.0
1890	76,207	1,109,952	188.1	24.4	7.7	119.7	4.9
1889	68,677	1,051,169	185.5	24.7	7.5	127.3	5.1
1886	52,802	845,914	171.0	24.4	7.0	101.5	4.5
1883	44,064	774,663	155.0	23.8	6.5	110.0	4.6
1880	30,376	539,255	154.3	23.0	6.5	See Note A	
1877	20,890	392,175	145.9	24.3	6.0	No figures	
1874	17,342	358,055	132.6	24.1	5.5	available	
1871	11,598	244,289	130.0	23.6	5.5	prior to 1888	

These figures, since 1890, are obtained from the Interstate Commerce Commission reports; prior to 1890, from Poor's Manual, the car loading, or "tons per car per mile" previous to 1890 being estimated.

If in making this estimate we allowed

a greater load per car mile we would thereby necessarily create a slower movement per car per day since the total performance of "ton miles per car per day" is made up of the two factors of "tons per car mile" and "miles per car per day." It is evident we can not hope for any great improvement in the average miles per car per day.

The controlling features of the ratio of empty movements to loaded movements are the preponderance of loaded movements in one direction, namely, the outbound movement from the territory where the raw material originates to the consuming centres, and, secondly, but in a less degree, to the practice, more or less necessary, of supplying special equipment for certain commodities, which cars are unsuitable for general traffic. Eastbound tonnage dominates because in the exchange of commodities the raw materials necessarily bulk and weigh more than the finished product, and, broadly speaking, in the west the raw materials is produced and in the east dwells the producer of the finished article.

The figures on the Grand Trunk Ry. are as follows:

Eastbound tonnage..11,281,677=	59.7%
Westbound tonnage.. 7,596,026=	40.3%

Total18,877,703=100.0%

Consequently on our system to move the tonnage east requires an empty movement west equivalent to approximately 20% of its total movement.

This movement is controllable only to the extent that the rate on raw materials is capable of adjustment. There should be at least a safe margin between the tariff rate and the actual cost of transportation, otherwise the railway will unduly encourage the long distance movement of raw materials instead of encouraging local development of the finished product, with the more profitable rate, and this development of the manufacturing or industrial centre, where formerly the field, the mine, or forest existed, tends to equalize the inbound and outbound movement, as well as to produce an increase in the merchandise and other more profitable traffic in the inbound loaded cars. We thus get a loaded haul in both directions at better rates instead of a loaded haul in one direction at a low rate. The empty movement may be further controlled by supervision.

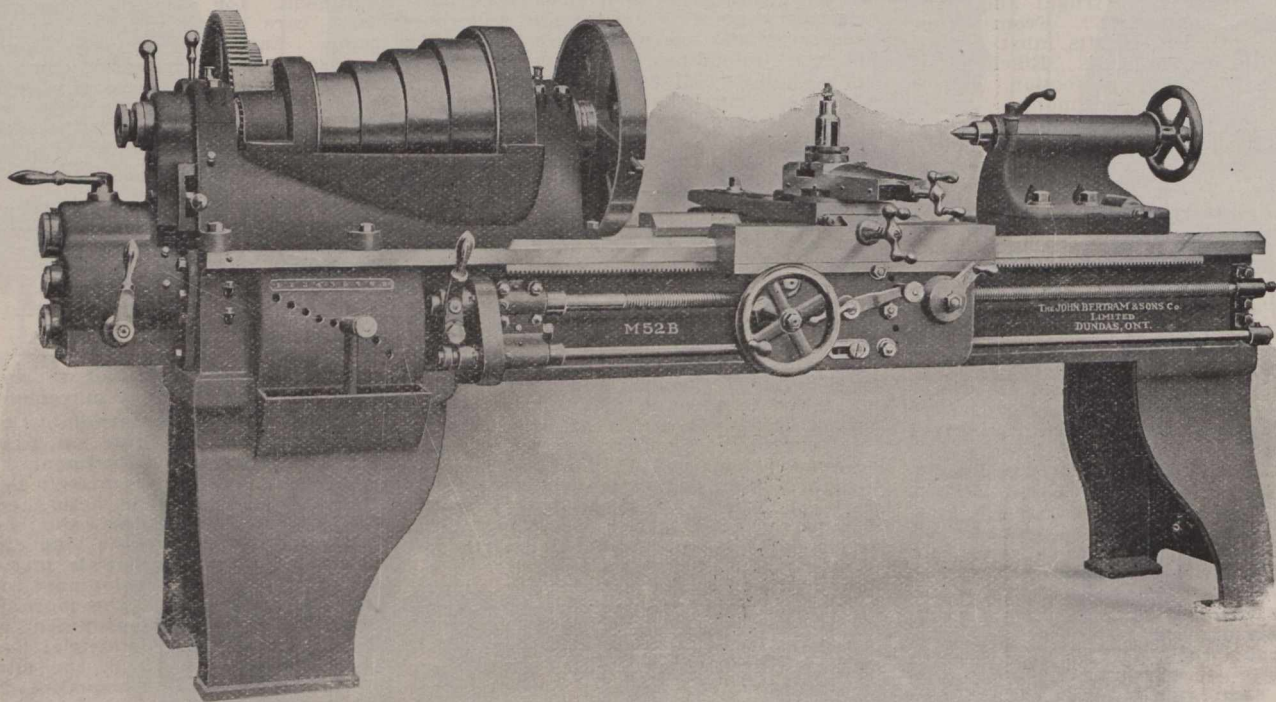
Such equipment as empty coal or flat cars returning to the mines and forests should be utilized, if at all possible, for the commodities moving in box cars if in the direction of the preponderance of traffic. Avoid the use of the standard box car in the direction of the preponderance of loaded movements if other equipment is moving empty in that direction. Never move an empty in the same direction as the preponderance of traffic if the empty car can be induced to carry a load.

Broadly speaking, movement of empties westbound is justified, as the preponderance of the tonnage moves eastward, but an empty movement eastward should be jealously watched, and every means taken to eliminate or reduce such movements. To illustrate: Anthracite coal should not be handled westward from the Niagara frontier in open cars, as such cars are not suitable for the eastbound traffic. To haul an open car westbound, loaded, usually results in an eastbound empty movement, and this again is duplicated by a westbound empty movement of a box car in order to provide a car for the eastbound loading.

A New York road's box car empty at London should not be sent to the Niagara frontier empty en route home, but should be sent to Chicago for loading eastbound, and this is true, even though the eastbound loading at Chicago is exclusively for Portland, Me.,



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which might necessitate the return of the car empty from Portland to the Niagara frontier. The merit in this is not always at first glance appreciated, and there are times when it would be unwise, but for the greater part of the time there is a loaded movement eastward through Michigan which can only be taken care of by the empty movement of box cars from the seaboard, and the movement of any box car empty eastward against the stream of empty box cars moving westward, would require investigation.

Has the efficiency of the transportation department kept march with the increased facilities supplied by the mechanical department? The capacity of cars and the weight of the loading in recent years has increased as follows:

Year	Capacity	Average loading	
		all cars	Tons loaded cars
1902,	28 tons.	11.8 tons.	16.8 tons.
1905,	31 tons.	12.3 tons.	17.6 tons.
1907,	34 tons.	13.9 tons.	19.9 tons.

This low state of efficiency seems, at first glance anything but creditable, especially when we consider that coal tonnage is 33% of our total, and ore, stone, and other products of the mine, bring the percentage to 53%, while, adding grain, cement, lumber and like commodities, which lading usually approximates the full capacity of the car, makes the percentage 73%. Flour, sugar, meats, oils, liquors, manufactures, vegetables, and commodities of fair weight account for 20%, while hay, stock, mill feeds, furniture, vehicles, merchandise, etc., amount to but 7%. It is through the shippers that the influence must be exerted to obtain a full loading of the car. The average minimum carload weight of the 4,700 articles mentioned in the Freight Classification is 26,000 lbs., and, although in shipments of coal, ore, grain, lumber, and many other commodities, a loading approximating the capacity of the car can be secured, there is but little stimulus to the shipper to produce this result, or any result, in excess of the minimum. The freight traffic department, then, should, adjust the minimums, following closely the increase in car capacity.

Agents and shippers should appreciate that tariff rates are not based on the expectation that the minimum load is to be the usual load, but we hope for, and expect, a capacity load, the minimum being the breaking point between profit and loss. When it is essential to the shipper, the minimums will be accepted, but it is essential to the railroads that the minimums should not be frequently used.

The daily car report acquaints the headquarters or staff officer with the situation on the line. Every car on hand at the station is reported by the agent daily. The report shows the arrival of the car, contents, the reason for the delay, if any, and, if the delay is chargeable to the shipper, the car demurrage accrued and the amount of free time and occasion therefor; the departure of the car, contents and destination, and the number and kind of cars wanted for loading. With this as a basis, it is possible to know whether empty cars are moving in the same direction as the preponderance of loaded movements, and whether such empty cars can be pressed into service. It is possible to know whether the loaded cars are being loaded to their capacity and, if not, whether this is due to the space capacity of the car being out of proportion to the weight capacity with respect to the particular commodity to be moved. It is not wise to supply cars freely to a shipper, who, in order to save a few cents in the proper stowing of his goods, will not load above the minimum weight, while another shipper is suffering for want of cars and is willing to use them to their capacity. Careful supervision and judicious distribution of

cars is something the obstinate shipper can appreciate, if he feels the effects thereof. It is possible to know whether the car of large space capacity is being used unwisely for heavy commodities, and thereby reducing the ability to move the more bulky commodities, since it is wasteful to use a furniture car for pig-iron.

It is possible also to watch the delays, that the car service, train service, and yard service be in proper relation. A car deteriorates through age as well as use. An engine deteriorates chiefly through use. It is not economy that the equipment, which is perishable in nature and revenue producing in capacity, should be idle, through delay, to save capital expenditures in power. The amount of time cars are in yards waiting switching to their proper position, or waiting to be moved by trains, should be calculated. It costs no more to move a car to-day than it does to-morrow. If the car is not moved to-day, our revenue earning power is reduced in times of car shortage, the day's operations are hindered and made more expensive, the shipper waiting for the loaded or empty car has been inconvenienced, and the car itself has deteriorated. The only saving to offset this has been in the capital expenditure for the engine. This, of course, provided the delay was chargeable to a shortage of power, it being assumed that the available power has been used with the greatest efficiency. It is but seldom that delays can be properly chargeable to shortage of track room. The usual failure is that the available track room is not used sufficiently. The delay which is not chargeable to railway detention can be assessed and checked with this report as a basis, and this may be done better in the headquarters office of the transportation department than in the demurrage bureaus, and, in fact, can only be done properly in the railway offices.

The duplication of the work and the very evident weakness of the checking by the bureau naturally conduce to create a lack of sympathy in the agents. The arrival and departure of the cars, as reported by the agents, can be checked by the car service officer against the arrival and departure as reported by the train conductors, and the full time of the cars accounted for, properly charging the delays against the offending interest. Demurrage bureaus, though expensive, have been necessary, but not at present, since it is now discriminatory and illegal not to enforce the letter of the law in car demurrage, and, since the benefits of prompt loading and unloading have been so demonstrated to the shipper as well as to the railroad that, irrespective of the action of the competitor, we must in our own interest see that the rules are enforced. The reasons for the continued existence of the bureaus are not apparent.

As a daily car report gives the arrival and departure of all cars, with the contents and destination, this furnishes the means of supervising the schedules and loading of merchandise cars from the various freight houses. Careful attention should be paid to this, as this traffic constitutes the highest class freight, delay to which causes much inconvenience to patrons since it includes the daily supply of merchandise for the retailer. It is in the handling of this class of traffic that the claims for damage and loss are most likely to occur. The schedule should be prepared with a view to furnishing prompt delivery with the minimum of handling en route. The contents should not only be safely stowed in the car and so loaded as to be accessible at destination without re-handling, but fully loaded, so that as few cars as possible may be engaged in the service. It is proverbial that freight house tracks are of limited capacity, and way-freights

must not be overburdened with unnecessary car haulage.

The daily examination of these reports will disclose to what points straight cars should be loaded, and if a straight car is running too light, the freight traffic department's attention and efforts can be particularly directed towards securing additional business for the weak car. A check of the arrivals can be made to show whether schedule time is being maintained and whether the loading for one point is spread through too many cars, requiring greater concentration at starting point or en route. A merchandise schedule can, and should be so maintained that a freight solicitor can quote it with the reliance one ordinarily accords to a passenger train schedule. The symbol or manifest fast freight system of supervision can be extended to the l.c.l. movement, following the shipments through from starting point to destination. The car service man can appreciate what a relief this would be in eliminating complaints and reducing special requests to "please locate, rush and trace to destination shipment, etc."

The way-freight crew should load way-freight into the pick-up cars with the same system and with as much care and precision as does the freight house foreman at a large distributing centre. If this is done, much unnecessary transfer work at junction points will be avoided if the schedule for loading placed in the hands of the way-freight conductor is given careful supervision and adjustment from time to time, as the conditions require. Calculate where the greater tonnage to certain destinations originates, and start the pick-up car from that point, transferring and loading into it en route from the less important stations. Under such conditions, a greater part of the pick-up cars on way freights should not require re-handling at the terminal of the run, but might be immediately switched into their trains for forwarding.

In order to perfect this handling of merchandise, the staff handling "Over and short" reports, the tracers for l.c.l. delayed shipments, and the freight claims agent's forces in general (as distinct from the freight claims auditor's forces) should be assigned to the transportation department, in order that that department being at fault may be promptly and fully put into a position to correct the fault, since it has the authority to do so.

The symbol or manifest system, as applied to carload business, provides for the handling of special commodities in regularly scheduled trains of fast speed, and each car in each train is under direct supervision of the headquarters staff through a telegraph record of each movement it makes from the time it starts until it arrives at destination, each car being identified by its own code number. In this respect, transportation has reached a marked degree of efficiency.

With respect to train service; efficiency requires a faster movement of certain traffic, and this naturally concerns the higher classes which furnish the better revenue. The actual difference in the cost of furnishing such service, as compared with the most economical performance, should be carefully established and the information given to the traffic department, which makes the rates, and which requests that certain commodities be placed in the manifest schedules. The individual train expense, apart from the general operation, is made up of the two main items of wages and coal. The wages cost and the fuel cost must be carefully ascertained, and from this the cost per thousand equivalent gross ton miles arrived at.

The most economical performance in cost per thousand ton miles should be classed as the standard cost, and the tonnage handled most economically should

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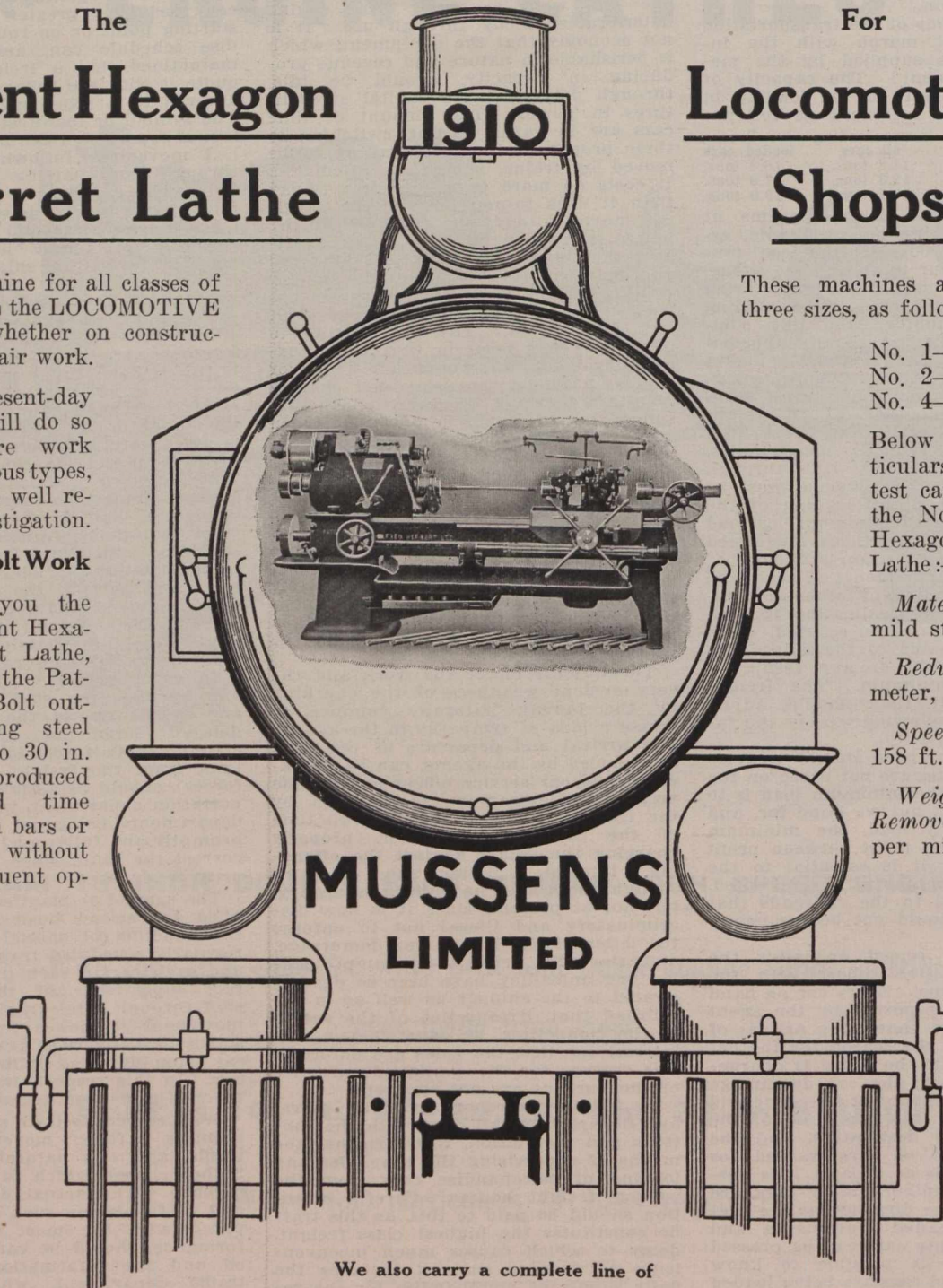
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be the rating of the engine. Variations from this standard cost per thousand ton miles in the daily performance of all engines on the division should be charged against the various causes contributing thereto. The standard cost per thousand ton miles applied to the loading of the engine, will give the standard for the trip.

If a train has been run light on account of maintaining a fast freight schedule, or if the train has been run light on account of failure of the engine, or on account of weather conditions, or due to the preponderance of traffic in one direction, necessitating a return movement with less than a full load, or from whatever cause "the ratio of the results obtained to the power expended" has been reduced, the actual waste in dollars and cents from each cause is known, and intelligent endeavor can then be applied to overcome the weakness. There are, of course, certain expenses which may be considered relatively as fixed expenses which do not diminish responsive to a fluctuation in the volume of business, but a goodly proportion of the expenses of operation of any railway are these immediately and directly controllable expenses, and the simplicity of the theory, the ease with which the actual results may be determined, and the deductions to be drawn from these results are so apparent that it would seem almost as inexcusable to operate without this measure of efficiency as it would be to operate a locomotive without a water gauge. If we do not watch our costs and know the reasons why, instead of guessing, trouble may be expected.

The practical tonnage rating for an engine being the tonnage which can be handled over a trip with the least expense in dollars and cents per thousand ton miles moved, it naturally follows that this most economical tonnage is the easiest on coal consumption, and is a tonnage which does not produce excessive locomotive repair bills. It also follows that it is a tonnage which does not occasion congestion of main line tracks by freight trains stalling on grades, and which does not cause congestion of yards by keeping an engine unduly long on the road between terminals, and unduly long in the shops when in terminals. The light tonnage for fast schedule, under such conditions, will not be called for by the traffic department more than is necessary, and a scrutiny of the commodities moving under fast schedule will be sure to have attention. Excessively heavy tonnage, with resultant leaky flues, increased coal consumption, overtime for crews, congestion of tracks and terminals, and delays to traffic, will be guarded against. There is in the utilization of power a still more important factor than economy. In contending against a heavy run of business beyond the ordinary ability of your power to move considerations of economy must give way to the demand for volume of movement. The test of efficiency then becomes the greatest ton miles moved per engine day instead of the ton miles moved per dollar. This in theory and practice has been well worked out by the Committee on Conducting Freight Transportation of the Association of Transportation and Car Accounting Officers and was well explained at the annual meeting in June, 1909, in Montreal. The value of these figures in educating a chief dispatcher in the use of his power cannot be over-estimated. From such figures, a chief dispatcher ascertains how best to accomplish results when the power does not seem adequate to the business offering, as it demonstrates how much tonnage can be moved in a given time, at various rates of speed and various tonnage loadings.

Fuel is a transportation department expense. The cost of the fuel in Canada

is 1-6 of the total cost of operation. There is no one factor in transportation expenses more subject to control, and in which efficiency is more to be desired, than in the handling and use of the coal. It is too important an item of expense to be under divided authority. The ordering of the coal forward from the mines, the supplying of cars to the mines, the checking of the receipt on arrival, the distribution to coaling stations, the responsibility for an adequate supply being at each coaling station, the unloading into coal chutes, the delivery to the engines, the stocking or lifting of reserve or storage coal, the under or overloading of the engines with train tonnage, the education and supervision of the fireman and engineer in the use of coal, comparative performance records of each engine and each engineer and fireman, the accounting to the auditor and charging out the coal to the various purposes for which it has been used—the whole handling of the matter, subsequent to the contracting for purchase, should be in the hands of the transportation department, and their recommendation should prevail in the selection of the mines and veins, and as to the quality and character of coal to be purchased.

Following are extracts from an article on "Two great needs of American railway organizations," published in a U. S. railway paper in Feb.: The tendency is toward the establishment of larger railway systems. This makes ever more pressing two great needs of American railway organizations. One is the adoption of means for the development of increasing numbers of broad executives. The other is the decentralization of management. On the railway of 100 miles the same man may be general manager, traffic manager, and several other things, and get a wide variety of experience. A railway of 1,000 miles long requires a specialist at the head of every department. The management of a railway system of 10,000 miles must carry specialization of the functions of its officers yet farther. Because it can do so, and get or develop the best specialists, is one of the main reasons why it can be more economically and efficiently operated than ten railways of 1,000 miles each. But specialization can be carried too far; and on American railways it very commonly is. Special branches and departments must be well co-ordinated to produce the best results. That they may be so co-ordinated there must be convergence of authority over them somewhere. The only way afforded by the railway business to produce men who are big enough to be not merely freight or passenger men, but real traffic managers, not merely transportation, mechanical or engineering experts, but real general managers, is to give numerous men the opportunity to get a broader experience than can be gained in any special branch, and then to select for the higher executive offices those who best avail themselves of the opportunity, regardless of their special line. Excessive centralization seriously interferes with the establishment and maintenance of satisfactory and salutary relations between the railways and the public. Of course, subordinate officers would, in each case, exercise their authority only in furtherance of a general policy laid down by their superiors, and would be held strictly responsible for the use or abuse of their enlarged discretion. Becoming experienced in assuming larger responsibility and exercising larger authority, they would be better fitted for promotion to higher positions; and the business of the road would be transacted with more dispatch and efficiency, and more satisfaction to the public."

The writer then comments, as tending to produce the desired results, on the

"unit system" of organization, explained by Major Hine, and which is being tried in the operating and maintenance departments of the Harriman Lines. There are some good things in this "unit system" idea, but I doubt that the Hine system will be extended over any considerable number of railways, although it is already being tried on many divisions of the Union Pacific, Southern Pacific, and O.R. and N. companies. This is, however, indicative of the feeling which many share, that the present organization of our subordinate official staff is not producing the results that are to be desired. To what extent this may be due to a defect in our system, or to a misdirected economy, it might be difficult to estimate.

The growth of our large systems is the result of the thought and energy of our strongest men, and this development has been accompanied by increased harmony, co-operation, and specialized effort, to the advantage of railroad operation and net profits. The marked development in this respect has been in recent years. The strong men responsible for the operations of these large systems to-day, acquired their experience under somewhat different conditions than are likely to prevail in the future. The fear is prevalent that the railway officer of the future will not have that personal experience of the whole railway operation that comes from active participation in the daily work of the track, train, and station. The large systems are so thoroughly departmentalized, and the work so assigned to specialists, not only in the staff offices at headquarters but out on the line, that the opportunity for acquiring experience in the various phases of railway operation is not as free as in the past. But it is also to be noticed that the evil ferment in the press, parliament, and the public concerning railways is of recent growth, and is coincident with the elimination of the local railways with their staffs of local officers who had a personal acquaintance and sympathy with the local people.

It is a well known fact that where the conditions otherwise are equal, the local railway has a greater traffic securing strength than has the large system between two common points. The public support the local railway, both with their business and with their sympathy, from the double feeling of a more intimate acquaintance and a recognition that their desires and needs, in transportation matters, are in harmony, whereas, with a lack of personal acquaintance and due to the distance of the headquarters from the extremities of the larger system, there is not only created a mutual condition of estrangement, but a fear of conflict in politics, which breeds discontent and agitation. There should be some means of re-establishing the relations between the large system and its patrons that is so much a factor in the strength of the smaller system. If we are in the business of manufacturing and selling transportation, we should know our market and our customers as we know our processes.

It is the practice on all railways—prevailing, of course, on the larger systems to a larger extent—that when the staff officer finds his contact with the public—or, it may be, with the employees—insufficient to bring forth the results desired, he supplements his efforts by appointing a travelling representative to strengthen the organization at the weak spot, and this has developed to the extent that we have travelling freight agents, travelling passenger agents, travelling car service agents, travelling auditors, travelling tariff inspectors, travelling baggage inspectors, claims agents, lost freight agents, weighing inspectors, etc., etc., all of whom are designed to bring the departmental head in contact with the man on the ground that his

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CHARLES MILLER,

PRESIDENT

policies may have proper adjustment and may prevail. The net result is inefficiency. The staff officer, the agent, and the public remain to too great an extent unacquainted, both personally and in knowledge or understanding. It is well that someone with a comprehensive acquaintance with the various departments and departmental heads, and policies, should be in personal touch with the customers or patrons, and one who in the local mind officially and broadly represents "the system." For a patron to direct a question or a complaint to an employe under present conditions partakes too much of the nature of shying the ring at the board of walking-sticks at the fair—the opening (for an intelligent reply) appears amply sufficient, but it does not seem ever to strike the right head. "I do not know," or "try the other department" is too frequently the answer.

As a possible solution of some of the difficulties, as a possible means of strengthening the present organizations where we are confessedly weak, and as a possible means of providing for the education of the railway officer of the future, I would suggest the elimination of the departmental travelling inspectors and travelling agents, or, rather, the "hop, skip and jump" features of the present travelling man who only has time now to touch the spots that protrude, and I suggest substituting therefor a line officer bearing some such title as "general agent," or "district agent," equipped by broad experience and thorough training, and who will be, within his limited territory, a direct representative of each of the departmental heads, with a personal acquaintance, not only with the departmental head, but with the individual shippers, and an intimate acquaintance with every employe within his jurisdiction.

This does not contemplate disturbing the present position and jurisdiction of, and the relations between, the superintendent, the district passenger agent, the division freight agent, and the staff officers of the various departments, nor does it contemplate disturbing the responsibilities and duties of the general agent at the large terminal, but, rather, the strengthening of these. As the superintendent should be in his purview, if not in authority, a general manager within his district and yet he carries out the policies of the staff officers at headquarters and their organizations, so under the superintendent, and assisting him in the co-relation of the departments, and assisting him in the selection, education, and supervision of the station staff, should be the "division agent" in charge of the relations with the public and of the station staff within his smaller territory and outside of the larger terminals; competent to educate, discipline and develop the station forces; thoroughly versed in all features of station work; competent to inform the superintendent of the individual needs of the stations in facilities or men; responsible for the promotion of the company's interests in securing traffic, both freight and passenger, and seeing that the same is given proper care and dispatch at the stations; that the facilities furnished are efficiently used; that the personnel of the station staff is of a proper moral character to appreciate the duties entrusted to them; that in their relations with the public the station staff is courteous, intelligent, and solicitous of the company's interests. With such a staff of subordinate officers covering, for example, let us say, 100 to 150 miles with some 20 stations, we could safely eliminate the travelling man, who perforce spends his time and energy in car seats and hotel chairs seeking or waiting the opportunity for a momentary interview with the distant or elusive stranger, hoping if he should perchance find his man at the end of the trip, that he may find

to an intimate acquaintance, but in the blind chance of fickle fortune. The departmental head under such an organization as is suggested could depend upon having a local representative close to the scene of action, close to the ground, him kindly disposed, not as unto or due with a thorough local acquaintance, a live wire, a salesman, in constant and sympathetic contact with the manufacturer of transportation and the consumer of the goods.

In a recent paper describing the apprentice system in the G.T.R. mechanical department appeared the following statements, which apply to the case in point: "The problem of supplying the demand for thoroughly trained mechanics has, for some years, caused much anxiety, and the G.T.R. some years ago endeavored to fill the breach and pioneered a movement which has since been copied on a minor scale by all the great railways of Canada and the U. S., as well as the largest manufacturing firms in both these countries, namely, the technical training of their apprentices. The master mechanic is constantly in touch with each boy's progress and standing, and, if necessary, he calls a boy up and in a kindly manner points out to him the necessity of applying himself more consistently. This has been the means of supplying the company with skilled mechanics in the most satisfactory manner. The first requisite in employing an apprentice is to know that he is morally, physically, and mentally capable."

If it is essential that the mechanic, who is handling materials, should be carefully selected and then trained to give efficient service, is it not as essential that the agent, who is not only in charge of the material property of the company, but is the custodian of its accounts, is its legal representative, the representative of the whole railroad organization in the public eye, and who is, in the final outcome, the conservator of its traffic resources; who represents directly the departments of traffic, audit, treasury, car service, telegraph, etc., should benefit by the adoption of some method of selection and of education better than we have at present, and of supervision other than in response to complaints filed. The travelling men of to-day supplement the work of the agent but inefficiently.

The local agent is neither born nor made, he falls into his job. Too often he is made to feel by his superior officers and their travelling representatives that every man's hand is against him. Too much criticism and complaint and too little assistance and education from these departmental experts comes his way. But the public are with him. As a rule, they respect and like him. Let us encourage him to do still better work by selection, education, intelligent supervision, by hope of advancement through the channels suggested, by recognition and sympathy from this suggested superior officer, "the division agent," who will know what the local agent is up against and how well he is doing. "The division agent" is necessary to supplement the work of the local agent. The local agent is tied to his station; too often to the right of way, the shipper has to come to him. The departmental officer rarely sees the local agent, the agent cannot go to him. The "division agent" would be foot-free; he can go to the shipper, he can go over on the competitor's ground and take observations, he can go to the staff officer and report or ask for information or advice. The feasibility of this proposed change of methods will depend upon the willingness of the various departments to join in co-ordination of effort, and will, of course, depend for its efficiency on the number and character of men employed and their training.

An experimental examination into the conditions on our own system develops

that we are employing on local work some 40 departmental travelling men, and, if in this calculation we deducted a sufficient number to leave undisturbed, of the present organization, enough staff to cover all of the large terminals, there would still be men and money ample to supply a district officer for each 100 to 150 miles of track dependent upon the importance of the stations. The field from which these general agents might be drawn would be the present travelling forces, the station agents, the headquarters offices, first, however, taking the candidate for promotion and placing him in each of the departments he is to represent and in contact with the head of the department a sufficient length of time to establish a thorough familiarity with the department's work, aims, theories, and personnel. With such a staff of subordinate officers to draw from there would be fine material, well trained, ready for promotion to the higher official positions in any of the departments of operation. In fact, education and development through this channel should be an essential factor in the preparation of the future officer.

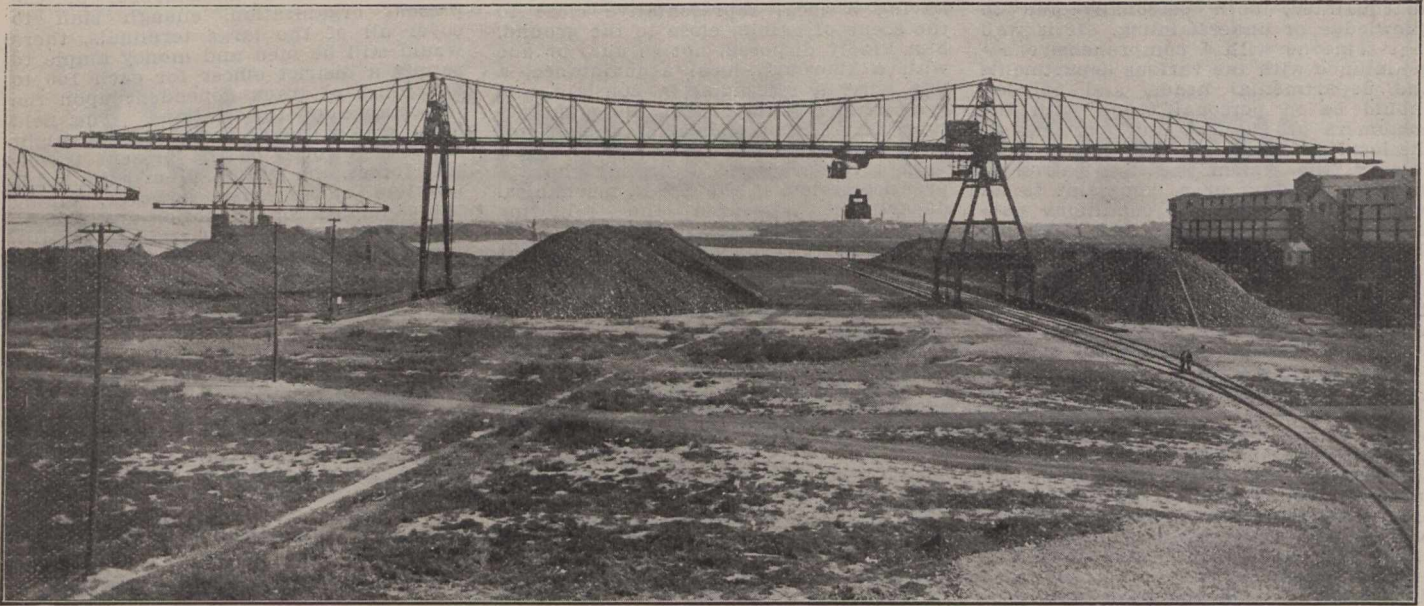
The foregoing paper was read before the Canadian Railway Club recently.

Michigan Central Rd. Pension Fund.

The Michigan Central Rd. put into effect at the beginning of this year, a pension fund for the benefit of its employes. The management of the fund is in charge of a committee styled the Board of Pensions, consisting of eight persons appointed annually by the president. The Board shall appoint a chairman and a secretary, and shall have power to make rules, subject to the approval of the president and directors, for the government of the department. It shall have power to determine the eligibility of employes to receive pensions, and to authorize the payment of pensions as provided by the rules. All employes are to be retired at 70 years of age, and those of them as shall have been continuously in the service for 10 years immediately preceding their retirement shall be pensioned. Any employes after 20 years' continuous service who are unfit for duty may be retired and be pensioned, but in case they are less than 70 years of age a medical examination will be necessary before they will be permitted to retire. The basis upon which the pension allowance is to be computed is for each year of continuous service, 1% of the monthly average pay received for the 10 years next preceding retirement. The directors reserve themselves the right to adopt a lower basis of pensions, if at any time the present basis creates demands in excess of \$56,000 a year, which is to be the maximum amount to be expended in pensions in any one year. The pension allowances will be paid monthly, but may be withheld or discontinued in the case of gross misconduct.

The persons who are entitled to pensions may have been in the employ of any of the railroads now amalgamated with, controlled or operated by the M.C.R., when they were independent; or employes on any of the so-called New York Central Lines, which has or may adopt a similar pension plan. A pensioned employe may engage in another business, but shall not re-enter the company's service; pensions may not be assigned. The rules also define continuous service; the manner in which service shall be computed; reserves various rights to the company, and provides for their revision.

The C.P.R. during 1909 handled 8,397,910 pieces of baggage, an increase of 659,189 over 1908. There was also an increase of about 50,000 in the number of parcels checked.



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RAILWAY DEVELOPMENT.

Projected Lines, Surveys, Construction, Betterments, Etc.**Alberta and Great Waterways Ry.—**

Pending the completion of the investigation by the judicial commission appointed by the Alberta Legislature into the circumstances surrounding the granting of the charter, the survey parties have been recalled. Construction, however, is reported to be progressing on the first 50 miles from Edmonton, and several contracts for clearing the right of way are said to have been let. The A. and G.W.R. Co. in order to secure a Dominion charter, acquired that of the Athabasca Ry., and an action has been instituted in connection with the transfer of this, by certain Toronto interests. (Feb., pg. 99.)

Alberta Central Ry.—

We are advised that the press report that the C.P.R. has secured control of this company's charter is incorrect. It is, however, stated by interested parties that the A.C.R. promoters have an understanding that the C.P.R. will, when the line is built, lease and operate the line. The Board of Railway Commissioners has approved of the location from Red Deer to Rocky Mountain House.

The Minister of Railways has approved of the route maps for this projected railway from Red Deer, Alta., westerly to the Rocky Mountains. J. T. Moore, President, and J. G. MacGregor, Chief Engineer, were in Ottawa recently in connection with the matter. They stated that construction would be gone on with this year.

Algoma Central and Hudson Bay Ry.—

The time for receiving tenders for the construction of the extension of the line between Hawk Lake Jct. and Hobon, Ont., on the C.P.R. transcontinental line was extended to April 30. The work tendered for includes clearing, grading and bridge work, and the extension of about 31 miles. This line will connect up the company's Michipicoten branch with the C.P.R., and it is intended in the future to complete the construction of the main line from the present track-end near Pangissin to Hawk Lake Jct. Grading had been practically completed between Pangissin and the Montreal River, prior to the reconstruction of the company in 1903. (Mar., pg. 185.)

The Dominion Parliament has extended the time within which the company's authorized lines may be built, and has increased the amount of bonds which may be issued, including securities already issued, to \$40,000 a mile.

Arnprior and Pontiac Ry.—A company with this title was incorporated by the Dominion Parliament in 1909, to construct a railway from between Quyon and Campbell's Bay, Que., on the Pontiac Pacific Junction Ry. (Ottawa and Northwestern Ry.) southerly to Fitzroy Harbor, Ont., crossing the Ottawa River at Portage du Fort; thence via Arnprior to High Falls on the Kingston and Pembroke Ry.; and from Fitzroy Harbor to Britannia on the C.P.R., and to South March on the G.T.R. The company has power to generate and dispose of electric power. The provisional directors are A. H. N. Bruce, R. Bruce, J. G. Gibson, Ottawa; J. Bell, Arnprior, Ont.; H. Keddy, Fitzroy Harbor. (June, 1909, pg. 413.)

Athabasca Ry.—See Alberta and Great Waterways Ry.

Bay of Quinte Ry.—The Dominion Parliament has extended the time for the construction of branch lines authorized in 1896, and for the Bridgewater-Actinolite line, subsequently authorized. (Mar., pg. 185.)

British Columbia and Alaska Ry.—The British Columbia Legislature has in-

corporated a company with this title, to construct a railway from Lytton, following the Fraser River Valley through Lillooet to Fort George, thence by the Stuart River valley via Fort Connelly to North Tacla Lake and thence to Teslin Lake on the northern boundary of the province; or, in the alternative by the most feasible route between Lytton and Teslin Lake; also from a point on the line to Vancouver, with branch lines, except that no branch shall be constructed, by the route now adopted by the Howe Sound, Pemberton Valley and Northern Ry., provided that nothing shall prevent the company from constructing its branch to Vancouver along the south side of the Anderson and Seaton Lakes, and via the Lillooet Lake and River. The provisional directors are J. Wolkenstein, New York; R. Smalles, Seattle, Wash.; H. B. Robertson, Victoria B.C. (Mar., pg. 185.)

A press report from Victoria, states that two parties have been organized in Seattle, Wash., for the survey of this projected railway. The parties, it is reported will make a start in May.

British Columbia and Manitoba Ry.—See Northern Empire Ry.

British Columbia Central Ry.—The British Columbia Legislature has incorporated a company with this title to construct a railway from Lillooet northerly by way of the Fraser River valley or other feasible route to Fort George, B.C. The provisional directors are:—J. C. Keith, A. McEvoy, J. C. Gill, Vancouver, B.C. (Mar., pg. 185.)

B.C. Mainland and Coast Industrial Co.—The British Columbia Legislature has authorized the company to build a railway or tramway from its works near Prince Rupert to the shore of the southwest of Kaien Island, to build a wharf there; and to build railways from its mines to its works. (Mar., pg. 185.)

The Cabano Ry. Co. was incorporated by the Dominion Parliament in 1909 with power to build a railway from Long Lake, Que., on the National Transcontinental Ry., through Temiscouta County to Cabano, Que. The provisional directors are:—D. Fraser, D. Fraser, jr., Plaster Rock, N.B.; A. Fraser, R. England, Cabano, Que.; W. Hayes, Notre Dame du Lac, Que. (Feb., 1909, pg. 101.)

Calgary and Fernie Ry.—The Dominion Parliament has granted an extension of time for the construction of this projected railway. (Feb., pg. 109.)

Cariboo, Barkerville and Willow River Ry.—The British Columbia Legislature has incorporated a company with this title to build a railway from near Eagle Lake, on the projected line of the G.T. Pacific Ry., thence following the watershed of the Willow River to Barkerville on the Cariboo Road, with branch lines not to exceed 10 miles in any single instance. The provisional directors are:—W. F. Dunphy, W. V. Marshall, Pincher Creek, Alta.; B. A. Laselle, Barkerville, B.C. (Mar., pg. 185.)

Chibougamau District, Que.—In reply to questions in the Quebec Legislature, April 10, it was stated that the Government will send a survey party into the Chibougamau district during the summer, and if the conditions warrant it a railway will be built into it, either directly by the Government, or by a company, aided by a subsidy.

The Minister of Mines and Fisheries stated in the Legislature, April 10, that engineers will go into the Chibougamau district as soon as circumstances will permit. If the country is, "as we are told it is," he added, "the Government will build a railway to it, or we will get one built, if we don't do it ourselves. The nearest railway point is at Roberval, on the Quebec and Lake St. John Ry., and 170 miles from the Chibougamau district.

Chicago, Milwaukee and St. Paul Rd.—Winnipeg city authorities stated April 8, that this company had not filed plans of a route into the city, nor had any correspondence on the subject been then received. The statement was made on account of the circulation of a report that the company had, through intermediary agencies, acquired land for a right of way within the city limits, and was negotiating for terminal facilities. At present the nearest point of contact from Winnipeg with the C.M. and S.P. Rd. is at Fargo, N.D., but surveys have been made this season for an extension of the line now terminating at Harlem, to Valley City, N.D. A Minneapolis, Minn., report states that this latter line will be extended north into Canadian territory. (April, pg. 271.)

Comox Logging and Ry. Co.—The British Columbia Legislature has incorporated a company with this title with power among other things to build a railway from Comox Harbor, 750 ft. east from the south-easterly corner of lot 82, north-westerly to the south side of Lower Campbell Lake, with branches not to exceed 10 miles in any one case, none of the lines to enter upon lot 48, Sayward district. The railway is to be used only as a private logging and manufacturing business, and the company has no power to carry on express, freight or passenger business. The company may purchase or lease the rights of the Comox and Campbell Lake Tramway Co., and can enter into agreements with any other railway or tramway company for running rights or to make connection. The provisional directors are:—A. D. McRae and R. J. McRae, Vancouver. (Mar., pg. 185.)

Diamond Coal Co.—The Alberta Legislature has amended the company's powers in certain particulars, so that it may take over and operate the Diamond Ry. (See Diamond Ry. and Coal Co., Jan., pg. 19.)

Dominion Atlantic Ry.—The Dominion Parliament has extended the time for the construction of the projected North Mountain Division. (Mar., pg. 185.)

Eastern Townships Ry.—An extension of time for construction has been granted by the Dominion Parliament. (Jan., pg. 19.)

Edmonton, Dunvegan and British Columbia Ry.—An extension of time has been granted by the Dominion Parliament for the construction of this projected railway. (Mar., pg. 185.)

Erie, London and Tillsonburg Ry.—The Dominion Parliament has granted an extension of time for the construction of this projected railway. (Mar., pg. 185.)

Fort Erie and Buffalo Bridge Co.—A company with this title was incorporated by the Dominion Parliament in 1909, with power to construct a bridge for railway and general traffic across the Niagara River with the necessary approaches from Fort Erie, Ont., to Buffalo, N.Y., subject to the necessary authority being obtained for the construction of the bridge from the Legislature of the State of New York. The provisional directors are:—D. McGillivray, Port Colborne, Ont.; W. E. Phin, Welland, Ont.; J. Battle, Thorold, Ont.; S. Casparis, Columbus, Ohio; D. Hyman, Buffalo, N.Y.; W. S. Hartuppe, Pittsburg, Pa.

Fraser River Lumber Co.—Press reports state that this company has let a contract to W. A. Gilley, New Westminster, B.C., to build a logging railway of 3.5 miles from Comox, to its timber limits. The contract includes the construction of a landing place and booming pond for logs at Comox.

Fredericton and Grand Lake Ry. and Coal Co.—A company with this title has

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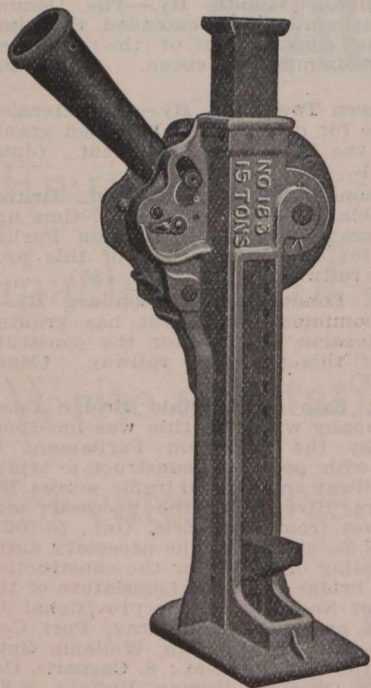
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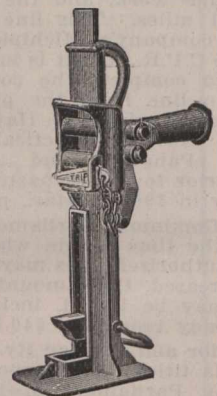
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GEARED LEVER TRACK JACK No. 183, with automatic lowering device; has four times the lifting capacity of the Plain Lever Jack. Specially adapted for wrecking work.

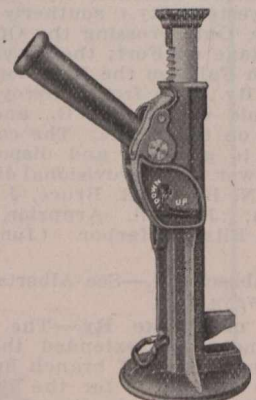
TOGGLE TRIP TRACK JACKS, Nos. 38 and 39, for line work and yard duty. The superior construction of these Jacks increases the grip and friction 40 per cent. or more above others of similar type.

FULL AUTOMATIC JACK, strong and reliable, combines highest efficiency with simplicity of mechanism.

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Full Automatic

A. R. WILLIAMS MACHINERY CO., LIMITED

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been incorporated by the New Brunswick Legislature to build in connection with its collieries a railway from Grand Lake to Fredericton.

Graham Island Ry.—The British Columbia Legislature has declared that the Graham Island Ry. Co. has been since Mar. 12, 1909, a body corporate and politic, with all the rights and privileges conferred by chap. 54 of the Statutes of 1909. This act provided for the construction of a railway on Graham Island. (Mar., pg. 185.) See also Island Valley Ry. and Queen Charlotte Island Ry.

Great Northern Mining Co.—At a meeting of shareholders at Eastern Harbor, N.S., Mar. 26, a resolution was passed authorizing the directors to apply for a charter authorizing the building of a line from the company's mill at Cheticamp to Eastern Harbor. The projected railway will be about 2.5 miles long. A preliminary survey has been made, and a route selected through an undulating country presenting no construction difficulties. The G.N. Mining Co. manufactures gypsum products, its mines and mills being at Cheticamp. The officers are:—President, P. J. L. Fiset, M.D.; Vice President, M. Fiset, M.D.; Managing Director, M. V. Grandin, M.E.; Secretary, P. Leclerc. (April, pg. 271.)

Hartland and Miramichi Ry.—The New Brunswick Legislature has incorporated a company with this title to build a railway from Hartland on the St. John River, to the Miramichi River.

Howe Sound and Northern Ry.—The British Columbia Legislature has changed the name of the Howe Sound, Pemberton Valley and Northern Ry. by striking out the words, "Pemberton Valley," leaving it as above. Sec. 3 of the act of 1907, provided for the construction of a line to Anderson Lake, and the present act authorizes an extension to Lillooet; and the extension of the line from the starting point near Newport, at the head of Howe Sound, to Vancouver, there to connect with any intermediate points. The adopted route of this projected railway is set out in the act incorporating the British Columbia and Alaska Ry. as follows:—Starting from the head waters of Howe Sound; thence north-easterly along the valleys of the Squamish and Cheakamus rivers to Green Lake; thence by way of Green River, Pemberton Meadows, and Pemberton Portage to Anderson Lake, thence along the north shore of Anderson Lake and Seaton Lake to Lillooet. (Feb., pg. 109.)

Howe Sound, Pemberton Valley and Northern Ry.—See Howe Sound and Northern Ry.

Hudson's Bay and Pacific Ry.—It appears from an interview with G. Attwood at Prince Albert, Sask., that the railway with which he is connected is the Hudson's Bay and Pacific Ry., and not the Prince Albert and Hudson Bay Ry. as first reported. This company was incorporated by the Dominion Parliament in 1896, Admiral Markham, together with other London, Eng., men being the provisional directors, with power to build a railway from Fort Churchill to Prince Albert, Edmonton and Lake Athabasca, about 1,600 miles. Surveys were made for the line by J. W. Tyrrel, C.E., Hamilton, Ont., in 1900-01, the route followed from Prince Albert to Fort Churchill being an almost direct one passing through Split Lake. During the winter of 1909, further surveys were made by A. H. May, and now Mr. Attwood has taken charge of the work. He states that he is organizing parties, obtaining supplies and equipment, and that the final surveys will be started early in May. A company has been formed in London, Eng., with the title of the Hudsons Bay and Pacific Ry. and Development Co. to finance the construction. Tenders have been asked for, and J. A. Taylor & Co., of New York, have submitted

prices, but, Mr. Attwood added, the contract has not yet been awarded. The company's plans are said to be that as soon as the survey parties have got out about 50 miles from Prince Albert, construction will be started. Mr. Attwood further stated that J. G. F. Greville and Herbert Spicer of London are interested in the company, the latter owning over 50% of the stock. H. Spicer is connected with the family of which Spicer Bros., one of the most extensive paper makers in Great Britain, is the representative in the mercantile world. (See Prince Albert and Hudson Bay Ry., Mar., pg. 187.) (July, 1909, pg. 477.)

Intercolonial Ry.—We are advised that a contract has been let to P. G. Kirk, Antigonish, N.S., to build a line between George's River and Sydney Mines, N.S., 9.09 miles.

The advertisement asking for tenders for building a diversion of the line at Chatham, N.B., has been withdrawn, and a new one is being inserted.

The Minister of Railways, stated in the House of Commons, April 4, that the Department had under consideration the question of developing water power at Riviere du Loup, Que., in order to supply electrical energy for use in the railway shops there.

A proposition is under consideration in Truro, N.S., with a view of asking the Dominion Government to build a branch line from Truro to Bruce or Tatamagouche, and establish a car ferry service thence to Charlottetown, P.E.I. (Mar., pg. 185.)

International Ry. of New Brunswick.—A train service has been in operation on the first 55 miles of this railway, from Campbellton, N.B., since Jan. 2, and up to the end of March, 4,213 passengers and 23,000 tons of freight had been carried. It was expected to start track-laying on the remaining portion of the line a few days after we were advised, April 6, and to have the line completed to St. Leonards, on the St. John River, in June. (Feb., pg. 109.)

Island Valley Ry.—The British Columbia Legislature has incorporated a company with this title to build a railway from Queen Charlotte townsite on Skidegate Inlet, Graham Island, westerly to the Hound River, thence northerly along the valley of that river and its tributaries, and the Yakoun River to the mouth of the latter river on Masset Inlet. The provisional directors are:—S. J. Castleman, W. Y. Corry and W. Henderson. (Mar., pg. 185.) See also Graham Island Ry.

Kamloops and Yellowhead Pass Ry.—The Dominion Parliament has extended the time within which this projected railway may be built. (Jan., pg. 19.)

Kettle Valley Lines.—The British Columbia Legislature has confirmed the agreement made Feb. 28, between the B.C. Government and the Kettle Valley Ry. Co. The agreement provides that in consideration of the company constructing without subsidy a line from Midway to Penticton, the Government will grant a subsidy to extend the line from Penticton to a junction with the Nicola, Kamloops and Similkameen Ry., near Nicola, 150 miles. The amount of the subsidy is to be \$5,000 a mile in cash or in the Province's 3% inscribed stock, payment to be made for the first section of 10 miles as soon as the second section has been completed, and so until the whole has been completed. The lines to be constructed from Penticton to Midway, and from Grand Forks to Franklin Camp are to be exempt from taxation for 10 years after the completion of the line to Nicola. The Government is to grant a free right of way through provincial lands, and to grant the use of public lands adjacent to the right of way for the procuring of stone, timber, gravel and other material which may be

necessary for the construction of the line. Construction is to be started within four months, and to be completed within four years after the ratification of the agreement. The line referred to from Grand Forks to Franklin Camp, a distance of just over 30 miles, extends up the North Fork of the Kettle River. Some little construction has been done on it.

The act confirming the agreement provides that independent valuers shall appraise the grade, or actually constructed line, between Midway and Rock Creek, of the Midway and Vernon Ry., constructed prior to 1909, breaking it as part of, or to be part of a completely constructed line, and the amount of such appraisal shall be paid to the credit of the valuers, who shall apportion it among the contractors who did work, or the merchants who supplied goods, during the construction of the Midway-Rock Creek section. During 1910, the company shall complete 25 miles of line; 50 miles during 1911; a further 50 miles in 1912, and the remainder of the lines within the four years mentioned in the agreement.

In connection with the carrying out of the agreement, an act has been passed repealing the provisions of chap. 45 of the Statutes of 1902 granting aid, or authorizing the grant of aid to the Midway and Vernon Ry. (April, pg. 271.)

A press report states that a contract has been let to W. P. Tierney & Co., for building a 10 mile section up the north fork of the Kettle River, from Grand Forks, B.C.; and that tenders will be asked at an early date for the construction of the Midway-Penticton line, and for other sections of the proposed extensions to be constructed under the agreement with the Government.

Lacombe and Brazeau Ry.—The Alberta Legislature has incorporated a company with this title to build a railway from Lacombe, north-westerly to the Brazeau River coal fields.

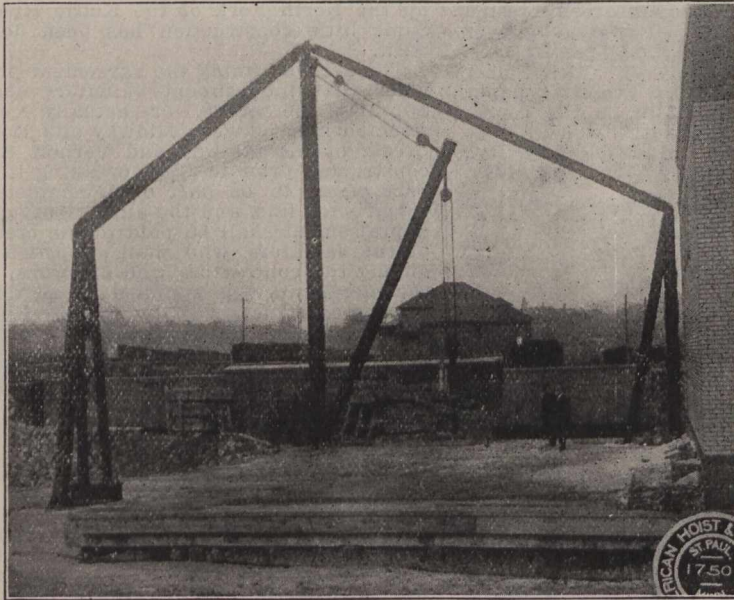
Liverpool and Milton Tramway Co.—The act incorporating this company has been amended by the Nova Scotia Legislature. The amending act gives power to extend the line to Bear River, passing through Greenfield. The extension proposed, it was stated in the Legislature, would pass through a level country, presenting few difficulties in the way of construction. The Government was asked to make a survey of the route to ascertain the probable cost of a line, with a view of making a contract with a company for its construction by means of a guarantee of bonds. (May, 1909, pg. 357.)

The London and North-Western Ry. was incorporated in 1909 by the Dominion Parliament to build a railway from London to Sarnia, Ont., and from London to Grand Bend, Ont., passing through Ailsa Craig and Parkhill, or either of them. The provisional directors are:—D. A. Stewart, T. E. Pound, J. Hall, London, Ont.; A. J. Stoner, Fernhill, Ont.; T. G. Turnbull, Komoka, Ont.; J. C. Knapton, Parkhill, Ont.; D. Milne, Sarnia, Ont. (Mar., 1909, pg. 173.)

Manitoulin and North Shore Ry.—An extension of time within which the company may construct its authorized railways has been granted by the Dominion Parliament. (Mar., pg. 187.)

Menzies Bay Ry.—The British Columbia Legislature has incorporated a company with this title to build a railway from Menzies Bay, Vancouver Island, either north or south of Trout Lake, approximately to the junction of Salmon River and Memckay River; also from Menzies Bay where the Quinsan River touches the south-east corner of lot 81 near the 50th parallel of north latitude. The provisional directors are:—J. H. McDonald, A. Charleson, J. T. de Pencier. (Mar., pg. 187.)

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NEW ORLEANS

THE ELECTRIC HEADLIGHT

The following letter was received under date of May 8, 1908, from Mr. J. W. Cleary, Travelling Engineer Pyle-National Electric Headlight Co.:

"I learn from _____ the Master Mechanic here, that an engineer running between _____ and _____ discovered a broken rail with the Pyle-National Electric Headlight and made the stop without ditching his train. One or two pairs of wheels got off, but that was a small affair to what it would have been where a foot of the rail was broken off. Also an engineer running east of here found some cars shoved out on the main line. He saw them with the 'Electric' and made the stop without hitting them."

PLYE-NATIONAL ELECTRIC HEADLIGHT CO.

MONADNOCK, CHICAGO

Midway and Vernon Ry.—See Kettle Valley Lines.

Northern Empire Ry.—The Dominion Parliament has granted an extension of time for construction.

A Lethbridge paper gives the officers of the company as follows:—President, D. L. McKinnon, Sudbury, Ont.; First Vice President, M. J. Fagan, Ottawa; Secretary-Treasurer, C. Brown, Ottawa. Among the moving spirits in the company, it is said, are, J. E. Lerter, of Chicago, Ill., and Lord Arthur Somerset, London, Eng., but it is reported that as the line will connect with the Great Northern Ry., south of Cardston, Alta., J. J. Hill's interests are really behind the company. The company also owns the charter of the British Columbia, and Manitoba Ry., and the two companies have power to construct somewhere in the vicinity of 2,000 miles of line. (Feb., pg. 111.)

Northern Vancouver Island Ry.—The British Columbia Legislature has incorporated a company with this title to build a railway from Hardy Bay or Port McNeill, or some point between them, or some other point convenient thereto on the east coast of Vancouver Island, to Coal Harbor on the west arm of Quatsino Sound, or to Rupert arm, Quatsino Sound, or to some other convenient point on Quatsino Sound, with branch lines, not exceeding 10 miles in any one instance. The provisional directors are:—J. H. McGregor, W. B. Garrard, H. W. R. Moore, H. B. Robertson, Victoria, B.C.; J. N. Britton, Seattle, Wash. (Mar., pg. 187.)

The Ottawa, Brockville and St. Lawrence Ry. Co. has been granted by the Dominion Parliament an extension of time for the construction of its projected railway. (Nov., 1909, pg. 829.)

Ottawa, Montreal and Eastern Ry.—The Dominion Parliament has incorporated a company with this title to build a railway from Lake Megantic, via Montreal, to Ottawa, and other points. (Mar., pg. 187.)

Ottawa, Rideau Valley and Brockville Ry.—The Dominion Parliament has incorporated a company with this title, to build a railway from Ottawa to Brockville, and a branch from Ottawa to Hull, Que., west of the Gatineau River. The company is given power to operate a steam ferry from Brockville across the St. Lawrence River to Morristown, N.Y. The provisional directors are:—A. McDiarmid, R. E. Elliott, Montreal; W. C. Maclaren, J. H. Gilmour, Brockville, Ont.; G. E. Kidd, D. H. McLean, Ottawa; F. A. Heney, E. W. Clarke, Nepean tp., Ont.

Pacific Ry.—The British Columbia Legislature has incorporated a company with this title to build a railway from the point where the Salmon River crosses the International boundary between British Columbia and Alaska, following the Salmon River to its source, with branch lines not exceeding 10 miles in any single instance. The provisional directors are: E. P. Davis, D. G. Marshall, C. B. Macnell, J. S. W. Pugh, Vancouver. (See Pacific and North Western Ry., Feb., pg. 111.)

Pine Pass Ry.—The Dominion Parliament has incorporated a company to build a railway from Edmonton, Alta., via Pine Pass to Fort George, B.C. (Jan., pg. 23.)

Port Moody, Indian River and Northern Ry.—The British Columbia Legislature has incorporated a company with this title to build a railway from Port Moody to the north shore of Burrard Inlet, thence westerly to the westerly side line of lot 256, thence westerly or north-westerly to the eastern shore of the north arm of Burrard Inlet, and along the easterly shore line to the mouth of Mesilloet or Indian River, at the head of the north arm. The pro-

visional directors are:—C. T. Dunbar, F. J. Henderson, J. H. McWatters, Vancouver, B.C. (Mar., pg. 187.)

The Prince Albert and Hudson Bay Ry. Co. was incorporated at the 1909 session of the Dominion Parliament, with power to construct a railway from Prince Albert across the Saskatchewan River, north-easterly to the mouth of Nelson River, on Hulls Bay, or to York Factory. The provisional directors are:—H. C. Hamelin, G. Russell, P. D. Tyreman, F. W. Halliday, Prince Albert, Sask., F. Eugen, Saskatoon, Sask. (April., pg. 271.)

Queen Charlotte Island Ry.—The British Columbia Legislature has incorporated a company with this title to build a railway from lot 15A on Skidegate Inlet, north-westerly to Stewart or Kundes Bays, Masset Inlet, with branches to Masset Harbor, and Rennell Sound. The provisional directors are:—H. R. Bellamy, A. Mours, E. W. Maclean, R. C. Brown and J. L. Kerr. (See Graham Island Ry., Mar., pg. 185; see also Island Valley Ry.)

St. John and Quebec Ry.—The New Brunswick Legislature has incorporated a company with this title to build a railway from St. John along the St. John River alley to the Quebec-N.B. boundary.

St. John River Valley.—The New Brunswick Legislature has authorized the Government to make a survey for a railway from Grand Falls, on the National Transcontinental Ry., via Centerville, Lakeville, Woodstock, Fredericton and Gagetown to St. John, or to the C.P.R. near Westfield; the line from Woodstock to be on the west side of the St. John River, and to have estimates prepared as to the cost of building such a line. The Government is authorized to guarantee the principal and interest of the bonds of any company prepared to build the line to the amount of \$25,000 a mile, and to take a first mortgage of the line as security. No guarantee of bonds shall be made until the Dominion Government shall have granted a subsidy at the usual rate, and shall have authorized the making of a contract between the two Governments for the leasing of the line and its maintenance as part of the Government railway system, 99 years. The line shall be constructed in a first class manner with gradients of 0.4%, laid with 80 lb. steel, and provided with masonry and concrete culverts, steel bridges with concrete piers and abutments.

The Government is also authorized to guarantee the payment of the principal and interest of the first mortgage bonds of any company building a railway from Andover via Centerville, and the same route as in the first mentioned line to St. John or to the C.P.R., to the extent of \$25,000 a mile. The line to be constructed shall be of the same standard as the I.C.R. in the province, the tracks to be laid with 70 lb. steel, and the bridges to be of steel and concrete. Construction to commence as soon as a contract is entered into, the line is to be completed by 1914. (April, pg. 273.)

The St. Maurice and Eastern Ry. Co. was incorporated at the 1909 session of the Dominion Parliament to build a railway from near St. Stanislas or St. Prosper, westerly crossing the Batiscan River, and the St. Maurice River, to and through Shawinigan Falls, Que.; or alternatively from the above line 10 miles east of Shawinigan Falls, north-westerly to a crossing of the St. Maurice River between Shawinigan Falls and Grand Mere, thence to Shawinigan Falls, Que. It is declared that the line is to cross the Canadian Northern Quebec Ry. near St. Stanislas, and the St. Maurice Valley Ry. near Shawinigan Falls. The provisional directors are:—J. Bourgeois, Shawinigan Falls, Que.; R. B. McDannough, Three

Rivers, Que.; J. L. Rintoul, J. A. Walls, F. P. Kaelin, Montreal. (June, 1909, pg. 415.)

Saskatchewan Central Ry.—The Dominion Parliament has incorporated a company with this title to build railways in Saskatchewan, between points given on pg. 23 of our Jan. issue. (Mar., pg. 187.)

Southampton Ry.—The New Brunswick Legislature has incorporated a company with this title to build a railway in York County, N.B., connecting with the C.P.R. (Feb., pg. 111.)

Temiskaming and Northern Ontario Ry.—Tenders are under consideration for the building abutments for a bridge at mileage 48.91; and for the substructure for a steel bridge across the Wabis River at mileage 119.13. Neither of these are large works.

The Commission has under consideration plans for the elimination of the curvature on the original portion of the line between North Bay and New Liskeard, Ont., 113 miles. The intention, as expressed in the annual report of the Commission, is to carry out the work of improvement until all curves exceeding three degrees have been eliminated. The report adds:—"Further surveys are now in hand covering proposed improvements of main line out of North Bay. Present gradient is 1.46 compensated—northerly directions. Preliminary reconnaissance to the west has been made, which points out that we have every reason to believe a line can be located, not exceeding gradient .75. Increased traffic warrants these surveys—opening up of north country—its possibilities in minerals, pulpwood, timber, et al—the connections at Cochrane (junction point of National Transcontinental Ry., and G.T. Pacific Railway)—the possibility of additional branches. Agricultural future, which after all is the mainstay, not alone of railway, but of the people. Agricultural prospects are so pronounced that we are warranted in assuming that largely increased traffic will arise therefrom ere the lapse of many years. These in themselves demand the re-alignment of the very heavy grades out of North Bay, even though the cost should exceed \$1,500,000. The sum though large can readily be absorbed, as the prospective increase of traffic appears to be within measurable distance, hence would warrant the re-alignment of railway in due course. Curvature—First Division of railway (say North Bay to New Liskeard, 113 miles), exceeding 50% of mileage (curvature in miles 50.2). Our efforts continue to be directed to improve; a very large amount of work in that direction has been done during the year, and, as traffic conditions warrant, improvements and betterments will continue, on similar lines."

Additional siding accommodation has been laid down at Cochrane; work has been restarted on the station (to be used jointly with the National Transcontinental Ry.); and it is proposed to expend considerable money during the current year upon improvements in and around the station, yard and townsite.

Engineers have located a route for the proposed branch line from Charlton to Elk Lake and Gowganda, 49.5 miles. On the first 19 miles to Elk Lake the maximum gradient will be 0.8% and the the maximum curvature three degrees, while on the section to Gowganda the maximum gradient will be 0.8% and the maximum curvature five degrees. Location plans have been prepared for a spur line of 7.25 miles from Cochrane to Frederick House River; and for the extension of the main line northerly from Cochrane. On this extension track is reported to have been laid. We were advised April 13, that it has not been decided whether any construction will be done on these lines this year. (pg. 273.)

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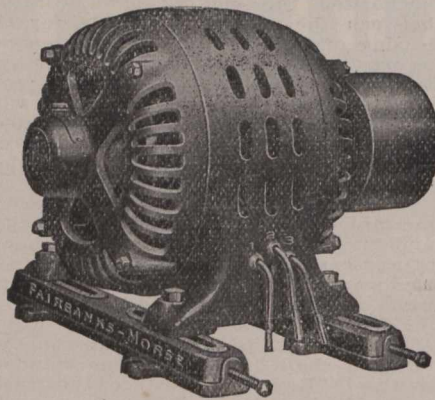
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CATALOGUES UPON REQUEST.

THE CANADIAN FAIRBANKS CO., Limited

FAIRBANKS SCALES — FAIRBANKS-MORSE GAS ENGINES.

Montreal Toronto St. John, N.B. Winnipeg Calgary Vancouver

Vancouver and Nicola Valley Ry.—The British Columbia Legislature has ratified and confirmed the act incorporating the company, passed in 1908, and extending the time for the construction of the line, for three years for starting work, and for eight years for its completion, from the passing of the amending act. (Mar., pg. 187).

Vancouver, Westminster and Yukon Ry.—The Dominion Parliament has granted an extension of time for the construction of the company's authorized lines. (Dec., 1909, pg. 887.)

The provisions asking for power to construct a bridge across Burrard Inlet were struck out by the House of Commons, although approved by the Railway Committee. (Dec., 1909, pg. 887.)

Victoria and Barkley Sound Ry.—A company with this title was incorporated at the 1909 session of the Dominion Parliament, with power to build a railway from Victoria, by way of Otter Point and San Juan, to near Sarita River on Barkley Sound, with a branch from between Metchosin and Sooke to Beecher Bay, on Vancouver Island, B.C. The company is authorized to operate a steam ferry service in connection with its railway between Beecher Bay, or other convenient point, on the Strait of Juan de Fuca, to a point in the United States. The provisional directors are:—W. K. Hous-ton, H. H. Jones, W. E. Laird, C. L. Betterton, Victoria, B.C.; J. M. Hawthorne, Seattle, Wash. (Aug., 1909, pg. 577).

White Pass and Yukon Ry.—We are advised that it is expected to complete the ore track to the Pueblo mine early in the current season. The extension involves the construction of about five miles of track, and is a continuation of the branch, started in 1908, but on which construction was suspended owing to the fall in the price of copper. The work on the extension is light in character, and involves no engineering difficulties. (See British Yukon Ry., July, 1909, pg. 475).

Canadian Northern Ry. Earnings, Etc.

Gross earnings, working expenses, net profits, increases or decreases from 1908-09, from July 1, 1909:

	Earnings.	Expenses.	Net Earnings.	Net Increase or Decrease.
July	\$ 813,500	\$513,900	\$299,600	\$26,700+
Aug.	807,100	602,700	204,400	18,300+
Sept.	1,076,800	765,300	311,500	60,400+
Oct.	1,384,200	903,500	480,700	60,600+
Nov.	1,517,600	970,100	547,500	134,000+
Dec.	1,160,300	825,900	334,400	49,300+
Jan.	792,200	669,700	122,500	22,200+
Feb.	698,900	567,400	131,500	33,100+
	\$3,280,500	\$5,918,500	\$2,362,000	\$110,400+
Inc.	\$ 1,616,600	\$1,206,200	\$410,400	.....

Approximate earnings for Mar. \$934,100, and for two weeks ended Apr. 14, \$503,100, against \$738,700 and \$358,300 for same periods 1909.

C.P.R. Earnings, Expenses, Etc.

Gross earnings, working expenses, net profits, increases or decreases over 1908-9, from July 1, 1909:

	Earnings.	Expenses.	Net Profits.	Net Increase or Decrease
July	7,140,029.93	4,660,159.20	2,479,870.73	205,297.48+
Aug.	7,426,984.62	4,462,926.75	2,964,057.87	385,159.16+
Sept.	8,323,178.03	4,891,288.86	3,431,889.17	1,317,281.40+
Oct.	9,744,596.87	5,358,299.68	4,386,297.19	1,731,030.48+
Nov.	9,075,963.93	5,383,625.98	3,692,337.95	1,471,258.60+
Dec.	8,214,758.04	5,099,334.94	3,115,423.10	918,671.53+
Jan.	6,104,426.90	4,787,830.51	1,316,596.39	926,846.56+
Feb.	5,992,052.14	4,505,032.30	1,487,019.24	724,874.46+

\$62,021,990.46\$39,148,498.82\$22,873,491.64\$7,680,419.67+

Inc. \$11,582,264.68 \$3,901,845.01 \$7,680,419.67.....

Approximate earnings for Mar., \$7,667,000, and for two weeks ended Apr. 14, \$3,776,000, against \$6,441,000 and \$3,045,000 for same periods 1909.

DULUTH, SOUTH SHORE AND ATLANTIC RY.—Operating revenue for Feb., \$213,702.93; expenses, \$158,921.33; net revenue, \$54,781.60 against \$195,620.73 operating revenue; \$154,005.83 expenses; \$41,614.90 net revenue for Feb., 1909. Aggregate operating revenue for eight months ended Feb. 28, \$2,144,772.38; expenses, \$1,473,-

882.20; net revenue, \$670,890.18, against \$1,776,445.76 aggregate operating revenue; \$1,308,625.92 expenses; \$472,819.84 net revenue for same period 1908-09. Approximate earnings for Mar., \$279,102, and for two weeks ended Apr. 14, \$124,540, against \$216,747 and \$98,898 for same periods 1909.

MINERAL RANGE RD.—Operating revenue for Feb., \$63,208.13; expenses, \$60,874.36; net revenue, \$2,333.77, against \$60,742.35 operating revenue; \$59,822.77 expenses; \$859.58 net revenue for Feb., 1909. Aggregate operating revenue for eight months ended Feb. 28, \$571,670.35; expenses, 489,294.32; net revenue, \$82,376.03, against \$551,255.01 aggregate operating revenue; \$458,574.85 expenses; \$92,680.16 net revenue for same period 1908-09. Approximate earnings for Mar., \$69,779, and for two weeks ended Apr. 14, \$27,155, against \$68,647 and \$28,685 for same periods 1909.

MINNEAPOLIS, ST. PAUL AND SAULT STE. MARIE RY.—Operating revenue for Feb., \$843,090.22; expenses and taxes, \$654,679.38; net revenue, \$188,410.84, against \$776,653.05 operating revenue; \$583,731.44 expenses and taxes; \$192,921.61 net revenue for Feb., 1909. Aggregate operating revenue for eight months ended Feb. 28, \$10,648,617.24; expenses and taxes, \$5,909,942.37; net revenue, \$4,738,942.37, against \$8,578,093.88 aggregate operating revenue; \$5,316,970.60 expenses and taxes; \$3,261,123.28 net revenue for same period 1908-09. Approximate earnings for Mar., \$1,880,360, and for two weeks ended Apr. 14, \$874,651, against \$1,576,818 and \$717,268 for same periods 1909.

CHICAGO DIVISION.—Operating revenue for Feb., \$652,753.80; expenses and taxes, \$472,371.36; net revenue, \$180,382.44, against \$535,919.59 operating revenue; \$443,288.24 expenses and taxes; \$92,681.35 net revenue for Feb., 1909. Aggregate operating revenue for eight months ended Feb. 28, \$5,653,263.08; expenses and taxes, \$3,999,685.86; net revenue, \$1,653,577.22, against \$5,002,885.31 aggregate operating revenue; \$3,605,930.55 expenses and taxes; \$1,396,954.76 net revenue for same period 1908-09.

Grand Trunk Ry. Earnings, Expenses, Etc.

The following figures show the earnings of the G.T.R., C.A.R., G.T. Western Ry., and D.G.H. and M. Ry., separately, for Feb., as compared with Feb., 1909:—

GRAND TRUNK RAILWAY.			
	1910.	1909.	
Earnings	\$2,248,000	\$1,964,900	
Expenses	1,866,000	1,643,800	
	\$382,000	\$321,100	
CANADA ATLANTIC RAILWAY.			
	1910.	1909.	
Earnings	\$116,000	\$106,700	
Expenses	111,000	120,800	
	\$5,000	*\$14,100	
GRAND TRUNK WESTERN RY.			
	1910.	1909.	
Earnings	\$461,000	\$351,900	
Expenses	372,000	321,700	
	\$89,000	\$30,200	
DETROIT, GRAND HAVEN AND MILWAUKEE RY.			
	1910.	1909.	
Earnings	\$140,000	\$105,900	
Expenses	118,000	101,500	
	\$22,000	\$4,400	

*Deficit.

TRAFFIC RECEIPTS FOR THE SYSTEM.

Aggregate from Jan. 1 to Mar. 31:—			
	1910.	1909.	Increase.
Grand Trunk	£1,545,426	£1,310,610	£234,816
Canada			
Atlantic	87,164	71,702	15,462
G.T. Western	310,519	258,354	51,805
D.G.H. & M.	93,958	72,485	21,473
Totals	£2,036,707	£1,713,151	£323,556

Approximate earnings for Mar., \$3,793,257, and for two weeks ended Apr. 14, \$1,643,783 against \$3,157,251 and \$1,462,946 for same period 1909.

G.T. Pacific Ry. and Prince Rupert.—The British Columbia Legislature has incorporated as a city Prince Rupert, the Pacific coast terminal of the G.T. Pacific Ry. Section 23 declares that the G.T.P. Ry. shall continue to have the first right to use the water of branch no. 1 of Hays Creek for the purposes of its railways and steamships not exceeding 40 miners inches. Section 26 gives the company a continuance of its easement for its pipe line as shown on the registered plan of the townsite, subject to the regulations of the city council with reference to entering upon, breaking up, interfering with and restoring the city streets.

Canadian Westinghouse Co., Ltd.

Following is the annual report for the year 1909:—The net profits as a result of operations for 1909 were \$498,379.94 an increase of 6% over 1908. From the year's profits, quarterly dividends at the rate of 6% per annum have been paid, amounting to \$261,540.33; \$70,000.00 has been added to the general reserve for depreciation of plant and property, which account now totals \$300,000.00; in addition to complete absorption as expense items, of all maintenance and replacement charges during the year, \$62,460.56 has been written off items included in property and plant account which are not directly productive from a manufacturing standpoint, and \$104,379.05 has been carried forward to the credit of profit and loss account, which shows the company's unapportioned surplus on Dec. 31, 1909, to be \$536,103.87.

In respect of the physical activities of the company the year 1909 has been the reverse of its predecessor. While in 1908 the process was one of continuous and severe contraction of activity, in the year just ended a gradual and accumulative resumption has taken place to approximately normal conditions in quantity of output. The condition of keen competition in prices and deliveries, both foreign and domestic, has experienced no abatement; in fact, has magnified during the year, making it a matter for very close attention in both the present and future conduct of the company's affairs. All departments, sales, engineering and manufacturing, have responded ably to the call laid upon them by this situation, and the result accomplished by the total of net profits realized is a measure of successful effort.

In the work of the past year your company has amply maintained its advanced position in the engineering and manufacturing fields. Many important engineering undertakings have been reduced to practical calculation and realization in recent development of Canadian resources, and your company has had its usual large share in the resulting orders for electrical apparatus. Incidentally, the distinction rests with your company of having manufactured during the past year, the only transforming and switching apparatus yet produced in Canada for operation in connection with lines transmitting electrical energy at a pressure of 110,000 volts, the highest transmission voltage yet attempted in any part of the world. Also, as an item in the year's manufacture, is included the largest generator yet built for Canadian installation, and which embodies the highest refinement of electrical and mechanical structure.

Sales during the year were the largest in the history of the company, about doubling those of 1908, and considerably greater than in 1906, our previously largest year, when much higher prices for apparatus were obtained. The cost of manufacturing has appreciably reduced during the year, and is an evidence of the continued efficiency of the plant and its manufacturing organization.

The company has, during the year, acquired office and warehouse premises in Winnipeg. A suitable site on Portage Ave. East, one block from the principal commercial centre, was secured and a building erected, adequate for our present needs and of sufficient capacity to take care of, for some years, the constantly increasing business of the Northwest, for which Winnipeg is the main distributing point.

The Niagara Falls, Ont., city council passed a resolution, April 11, requesting the Michigan Central Rd. to electrify the section of its line between Niagara Falls and Niagara-on-the-Lake, 15 miles.

CANADIAN RAILWAY EQUIPMENT COMPANY

Manufacturers of

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and Tenders

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—OFFICE AND WORK—

ESPLANADE STREET EAST, TORONTO

How to Improve the Roadbed.

By E. Desharnais, Roadmaster C. P. R.,
Medicine Hat, Alta.

Section ballasting should be done with material which is not too coarse. Roadbed should have a sub-grade according to height of dumps. In some places the sub-grade should be 18 to 20 ft. to retain ballast, as all big dumps settle for years after grade is completed, and if we give only 16 ft. sub-grade on big dumps and the dumps settle down 1 to 2 ft. in a couple of years, then we are obliged to haul ballast to lift the dumps to the grade and the result is that we have no shoulder to keep ballast firm.

Second applications of ballast for shoulder, especially on big dumps, never make strong shoulders, grass will not grow in ballast as well as in the dirt, when the frost comes out of the dump. I have seen many cases where ballast rolls down because there is nothing to hold it down to the dump and old ballast. I have never seen good grass grow in ballast. I think all big dumps should be built according to the height and a few feet allowed for settling down. Draining is one of the most important, if not the most important, thing in connection with the subject of which I am treating.

The division should be ballasted every six years, especially where there is heavy traffic, and if it is possible, ballast should not be too coarse, and each division should not have more than 25 miles of ballasting to do each year. This should be done as soon as the frost is out of the ground, or as quickly after as possible, in order to have the roadbed as solid as possible before the frost sets in in the fall. After the track has been lifted and put in good line, all track should be trimmed and the ties well filled with ballast. The ballast should be sloped from the rail to the ends of the ties, to only one inch below the top of the ties. My experience of trimming ballast in this way is that it will save the life of ties, because where ties are filled and a good shoulder is made we will have better track in all seasons of the year. The way we trim track to-day, we cannot judge the life of the ties, as the sun affects the ends of the ties too much and causes the ends to split, which allows the wet and dirt to get into the heart of the ties and causes them to rot quicker. I think we have changed more ties since we started the new standard way of trimming track than before this came into effect. It is more difficult to keep our track in good line by not filling up the end of the ties, especially on curves, and where the track heaves, and more expense is incurred in handling ballast. No matter how deep ballast is trimmed to the end of the ties, water never runs from the centre of the track to the ends of the ties. Even if the water does run from the centre to end of ties it does not improve the track, because it leaves the centre part of the roadbed too hard and makes the outside, especially near the rail, too soft, causing the track to go out of level. I have noticed this when riding an engine after three or four days of wet weather, especially where the track has been trimmed rather deep down the ties.

With the weight of rolling stock and the speed run, our system of changing ties cannot be improved upon at present. All our ties are inspected before they come out; after our old ties are taken out of the track they are piled up in such a way that they can be inspected by anyone, and they have been inspected from time to time, and I have found very few cases where ties have been taken out that should have been in the track any longer. I think if we abide by reports made by Mr. Dixon we will have no end of trouble with our track-

men, because, where the trackmen are lifting track is where they find the bad ties, and in many cases the tie will not be marked by the inspector, and will require to be taken out the same day, and there will be no tie to take its place, as we distribute ties according to the marking of the inspector. If we cannot trust our section foremen after long experience, to mark the ties in the spring, we should not trust them in the fall to find out how many ties are required for next year. My opinion is, if a foreman works on a section every day in the year, he is able to tell where the bad ties are, better than any inspector who may come along once a year over the division. I do not see how a man is able to test ties by sounding or looking at the top. The greatest trouble with ties to-day is, rotting underneath the tie, and breaking under the rail, and in many cases the tie may be sound in the centre, also at the ends, and may look to the inspector as good as new. We must lift the line and gauge our track to know where the bad ties are. We have also to consider the speed of the trains on certain parts of the road. I approve of tie plates being put on all ties on tangents as well as curves, and they should be put in before the frost is in the ground. If they are put in after the ties are frozen solid, it is liable to cause more broken rails. I also think tie plates would save the life of the ties a couple of years at least.

Especially on a new roadbed, all steel should be laid before the frost is in the ground. If steel is laid on a frozen roadbed all the loose ties should be blocked before any engine is allowed to run over the steel. No matter what kind of roadbed you may have you will always find loose ties, and if an engine is run over the steel without blocking, you will have bad track until the steel is changed. I know by experience that an engine running over steel without the ties being blocked will cause a large number of surface bent rails, and these rails cannot be straightened out, which will cause bad gauge as long as this steel remains in the track. The track will also spread in winter and you will never have smooth track. More expense is also incurred in trying to keep the track in good surface.

Where roadbed is over muskeg I would recommend 10 ft. ties with 56 lb. steel, to make a guard rail to be placed on the end of the ties with slot in each side and well spiked, to prevent the ties from bunching, and also to keep the main line rails from creeping and help to keep better line. I do not approve of cinders being used for lifting track on the main line, but when you come to muskeg, or soft places as may be found in cuts, etc., I think cinders are the best material to use, unless you have a very short soft place in the roadbed, which should be dug out a couple of feet under the ties and filled with crushed stone, and ties tamped with good ballast, and drained at that place to take the water out of the hole. If this is done, I do not think there will be any further trouble with that spot.

Each roadmaster having charge of a division should start a gang with 10 men, and place his best liner in charge of them, and line his division from one end to the other about the first of July after the heavy rain is over. Section foremen should have all their ties in by that time and most of the track up in good surface, but, as a rule, track is in poor line. This is due to the fact that every section foreman is not able to line track properly on account of his gang being too small to throw the track to line in many places, but by having a good gang to line track, especially at switches, you will have better riding track and switches, as it is impossible for a small section gang to line switches. Some foremen may be good trackmen, but may not be able to line track as well as others.

Shims should be supplied one year ahead of the time they will be required, and piled in a shed so that they will dry out without being exposed to the sun. In this way it will keep them from warping and cracking. Using green timber shims placed under the rail is the cause in many cases of spreading track. In places where a man is shimming from one-quarter of an inch up, four to six braces should be placed in each rail length. If we only shim one side of the track a brace should be placed on both sides, I mean a brace on each end of the tie. If you put a brace on one side only, the side the brace is on, when the spring comes, a loose tie in the ballast will cause a spread track on account of there being only one spike to hold the rail where there is no brace, and, the braced side will pull the tie from the rail where there is no brace. All braces should have a hole bored through the brace to put one spike in to prevent the brace from moving sideways, two spikes should be used to a brace, one at the end and the other in the hole, on light shimming. On shimming over two inches three spikes will be better on each brace. In a country like Alberta we should be supplied with two inch hardwood plank, four inches wide, so the sectionman can cut his braces to suit his shimming. A brace should not be more than 10 inches long. This would be economy to the company, as these braces will last from three to four years, and also save section foremen cutting new ties every year, the brace from ties being too soft, and the plank making a much better brace.

All shims over 1½ ins. should have a shimming spike every second tie from 2 ins. and upward. Shims 2 ft. long should be used and shimming spikes should also be used in every tie. No shimming should be done without level board.

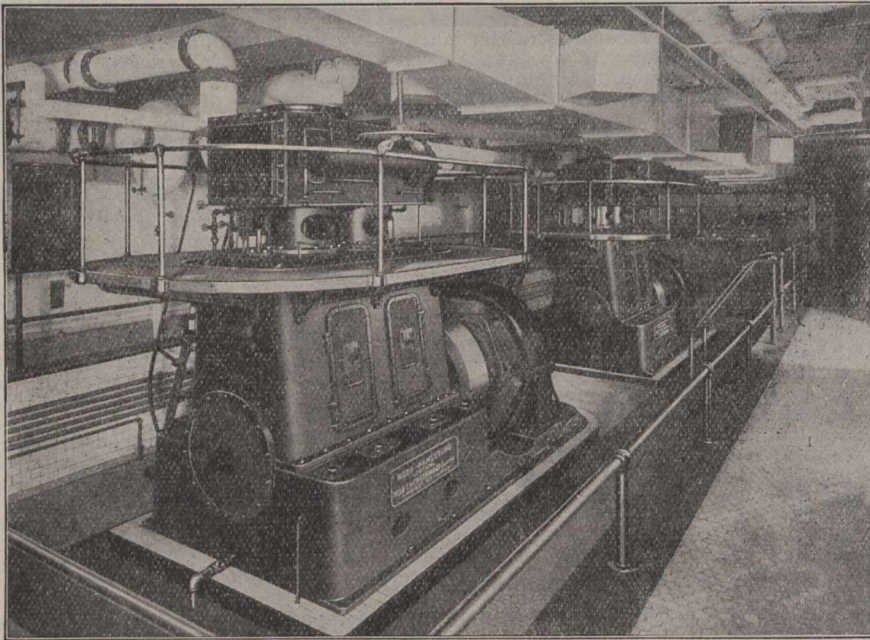
In some cases I have found the stakes set up by the engineers, especially on lifting track, have been put in very loosely, having been adjusted by the engineer, either by driving down or pulling up, after being put in ground. I think a good way of setting stakes for lifting track would be to drive the stake in the ground solid, the stake being long enough to be cut to adjust, and the stake not be adjusted by driving down or pulling up.

The foregoing paper was read before the Western Canada Railway Club recently.

The New York Railroad Club's committee on electrification, after a year's study of the subject, reports that no general information is available on the basis of which steam railways as a whole would be justified in electrifying terminals or main lines solely on the ground of economy. They consider that more attention should be given to the possibility of electrification in connection with heavy grades, and that it is necessary to proceed with caution in attempting the electrification of large freight terminals, which necessarily involve the traffic of a number of different roads.

The Board of Railway Commissioners has received an application from the C.P.R. for formal approval of the uniform bill of lading in use in the United States with respect to shipments from U. S. points to points in Canada, and from U. S. points through Canada to U. S. points, on the ground that doubt exists as to whether Canadian railway companies would have the protection of the U. S. bill of lading in the event of loss or damage affecting such traffic while in transit within Canada. The Board will discuss the situation fully with the railway companies subject to jurisdiction at the traffic sittings to be held in Ottawa on May 17.

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An Item in the Maintenance of Locomotive Boilers.

By George Twist, Locomotive Foreman C.P.R.,
Minnedosa, Man.

A great deal has been said about the trouble experienced in keeping locomotive boilers free from mud and scale, particularly in bad water districts. Boiler compounds of various kinds have been used, but the experiments in this direction cannot be said to have been successful. The water has been treated at the supply tanks, but has usually resulted in making no difference whatever, or else has caused boilers to foam so badly as to necessitate the washing out of the boiler each trip or the changing of water at stations where treatment is not necessary. Various designs of blow-off cocks or valves have been tried, some with part success, others resulting in complete failure. However, we still seem to be far away from the solution of the difficulty. In spite of the fact that the trouble has always existed, we still find ourselves with blow-off arrangements, the same in number, design and location as 15 years ago. The water legs of boilers seem to be the only places which have received attention in this respect. In the last few years it has been thought desirable to provide ports in the bottom of the barrel, which would suggest that we are alive to the fact that this part of the boiler requires most careful washing out. Then why not apply blow-off arrangements whereby this portion of the boiler may be cleared of a large proportion of this mud? Provision has been made for the more thorough washing out of boilers by providing additional holes for the purpose. Good washout tools have also been designed and provided. Have the same ideas been followed out in the effort to keep boilers free from mud when under steam? I think not. Very few designs of blow-off arrangements make them practical for use when an engine is running, a time which is a good one, and I think, a proper one, to blow out the superfluous muddy water, as at this time the water is in better circulation than when the engine is standing idle.

So much for our present arrangements for keeping our boilers free from mud and scale. Let us now consider whether a little different design of boiler could not be used for our bad water districts. Is it better to have engine failures, necessitating the removal of part or the whole set of tubes, or is it worth while to depart from the hard and fast rule which seems to prevail of having our tubes spaced so very close together? Undoubtedly, by spacing them further apart we would lose a little heating surface. But this would be overcome in a short time after the boiler has been in service by the fact of having little or no scale for the heat to penetrate. We would be able to wash the scale to the bottom of the barrel, which is now impossible to do, and with blow-off arrangements in the barrel we would be able to keep scale away from the tubes to a much greater extent than we can at present. Scale which lodges between tubes has a tendency and undoubtedly does gather other scale and mud, and in all cases in my experience of tubes being what is termed mud blocked, the examination of scale shows that the accumulation has been built there, not by the formation of scale, but by the gathering together of separate pieces of scale, the same being bound together and forming a solid cake around the tubes and causing them to leak. The only remedy then is to take out and renew the set or part set of tubes, which costs considerably, especially when the same performance is necessary every three or four months. I think the enormous expense of maintaining our boilers

could be considerably curtailed by starting out on the principle of designing boilers to suit bad water districts and the systematic installation of good reliable blow-off arrangements, together with enforced regulations to those responsible for using same. I would suggest that you invite others interested to give their experiences and suggestions.

[Editor's Note.—We hope that others will follow Mr. Twist's example and write us on this important subject.]

Reid Newfoundland Ry. Construction.

The Newfoundland Legislature has confirmed a contract between the Government and the Reid Newfoundland Co., for the construction of branch lines as follows:—From near Duffs on the West End branch, to Trepassey by way of the southern shore, 70 miles; from Broad Cove, on the Carbonear branch, via Heart's Content to Grates Cove, 70 miles; from between Come-by-Chance and Northern Bight, on the trans-island line, to Fortune Bay, 40 miles; from Shoal Harbor, on the trans-island line, to Bonavista, 70 miles; from Howley or Bay of Islands, on the trans-island line, to Bonne Bay, 30 miles. The contract provides that the lines are to follow the routes laid down by the Government, and are to be in all respects equal to the work of the railway constructed for the Government by the late Sir Robert G. Reid, under the contract of May 16, 1893. The right of way, station grounds, borrow pits and ballast pits are to be provided by the Government as required, and the company may take all necessary lumber for construction purposes from Crown Lands. The rate of wages paid on the work is not to be less than \$1.50 a day, and no work is to be done on Sundays. During the construction the contractor may carry such freight and passengers as may offer at rates not in excess of those charged on the existing lines. The Government agrees to pay, upon the completion of each five mile section of the lines a subsidy of \$15,000 a mile, and to admit free of duty the rails, fish-plates, fish-bolts and spikes necessary. The contractor also agrees to manufacture in the colony all the rolling stock necessary for the operation of the branch lines, all material and fittings being admitted duty free. The stations and other buildings are to be erected by the contractor, to whom the Government will pay the par value.

A second contract provides for the operation of these branch lines from the period of completion of each of them, until July 31, 1951, at least one passenger or mixed train being run in either direction daily, Sundays excepted, and as many additional through local passenger or freight trains as traffic may require. Mail and mail cars are to be carried as required at the rate of \$69.50 a mile a year. For such operation the company is granted 4,000 acres of land for each mile of branch lines to be constructed; such land to be granted upon the completion of each branch line. The existing clauses of the contract of 1898 and 1901, and the acts confirming them are to apply to these contracts unless specifically excepted.

The branch from Shoal Harbor to Bonavista, 70 miles, is under construction and is expected to be completed early in 1911. The contract calls for the construction of 50 miles each year until the whole mileage is completed.

Winnipeg press reports state that negotiations between the C.P.R. and its mechanics of the Western Lines, came to a conclusion Apr. 17, when the employees accepted the terms as laid down by the company, which are the same as were agreed to at the conclusion of the 1908 strike.

Recent New Brunswick Legislation.

The New Brunswick Legislature, which was prorogued Mar. 26, passed the following acts affecting transportation interests:—

Eastern Electric and Development Co.—Investing in the company the powers and franchises of the Sackville Electric Light and Telephone Co.

Fredericton and Grand Lake Coal and Ry. Co.—Incorporation.

Fredericton Street Ry.—Incorporation. Hartland and Miramichi Ry.—Incorporation.

International Ry. Co. of New Brunswick.—Amending company's powers.

Imperial Dry Dock Co. of St. John.—Amending acts relating to the construction of a dock.

Moncton.—Authorizing city to issue debentures, to make agreements with respect to construction of electric railway, etc.

Moncton Electric Ry., Heat and Power Co.—Amending 9 Edward VII., chap. 69.

New Brunswick Coal and Ry. Co.—Amending acts.

New Brunswick Ry.—Amending 33 Vict., chap. 49.

New Brunswick Railway Act.—Amending chap. 91, Consolidated Statutes of 1903.

Northern New Brunswick and Seaboard Ry.—Authorizing Gloucester municipality to grant \$25,000 to provide a right of way for the railway, and to procure and complete shipping facilities in some port in Gloucester county.

St. John and Quebec Ry.—Incorporation.

St. John Drydock.—To aid the construction of a dry dock.

St. John River Ry.—To aid the construction of a railway along the St. John River Valley.

Tobique and Campbellton Ry.—Amending acts authorizing construction of the railway, and extending time for construction.

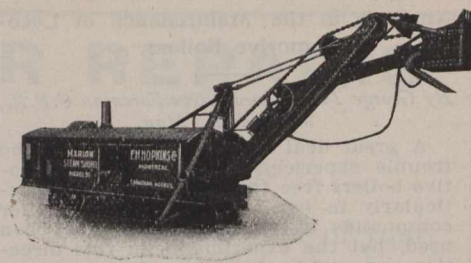
Wireless Telegraphy.—H. LaV. Twinning, B.A., of the Physics and Engineering Department of the Polytechnic High School, Los Angeles, Cal., has rendered a valuable service to amateur electricians and the students in technical schools by the publication of a little volume on "Wireless Telegraphy and High Frequency Electricity." It aims at supplying in a clear and concise manner such information as will enable anyone to design and manufacture high potential transformers for wireless or high frequency work. The first chapters deal entirely with the construction of the transformer and other apparatus, and are followed by detailed instructions for its installation and operation; and, in conclusion some theoretical information is given. There are 11 full page half-tone illustrations, and 86 cuts illustrating the text, but what gives the work a particular interest is the table at the end giving data for the construction of 14 sizes of transformers from 100 watt to 5 kilowatt. In the preface, the author refers to the help given him by the boys of the school in the experiment work.

Railway Guarantees in British Columbia.—The B.C. Government under the authority of the Shuswap Ry. Guarantee Act, 1890, and the Nakusp and Slocan Ry. Aid Act, 1894, has to make provision for paying interest on the bonds of these railways in excess of earnings; and under authority of the Victoria and Sidney Ry. Subsidy Act, 1892, for paying interest on its bonds. The amount estimated to be required to provide for these payments for the year ending Mar. 31, 1911, is \$40,000.

The C.P.R., it has been announced will put on a motor car service on the Lenore and Miniota branches, May 1. The service will be operated from Brandon, Man.

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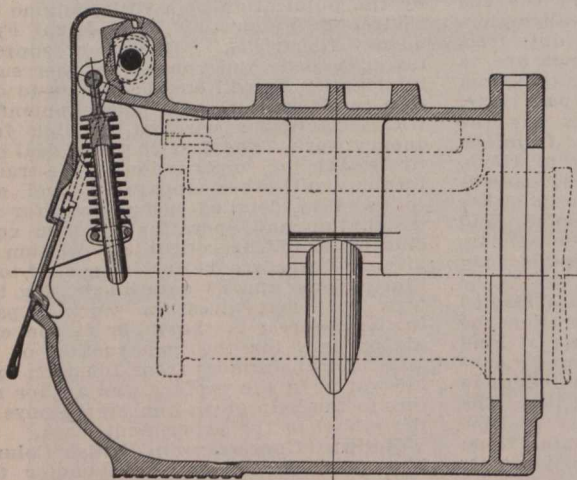
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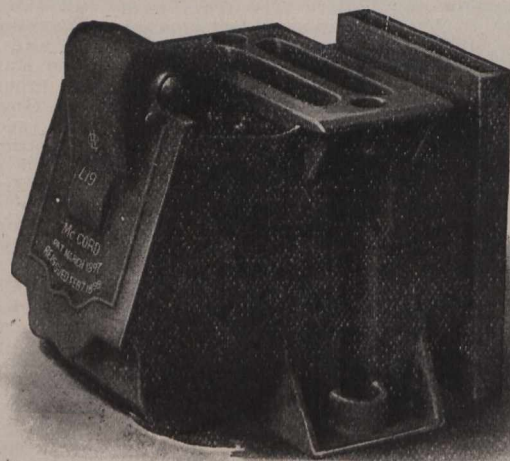
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Railway Freight Statistics.

During the year ended June 30, 1909, Canadian railways carried 66,830,019 tons of freight, against 63,071,107 tons in the previous year. Of the total tonnage relating to commodities 36,075,101 tons were reported as originating on the lines, and 30,754,918 tons as having been received from connecting lines. The following table shows the grand totals of the various classes of freight carried, whether originating on the various lines, or received from connecting lines:

NAME OF RAILWAY.	Tonnage Originating on Road	Tonnage received from connecting roads & other carriers.	Total freight tonnage
Alberta Railway and Irrigation Co.	96,901	54,084	150,985
Algoma Central and Hudson Bay	361,950	983	362,933
Atlantic and Lake Superior	16,238	21,781	38,019
Atlantic, Quebec and Western	3,975	9,295	13,270
Bay of Quinte	92,403	49,372	141,775
Bedlington and Nelson	2,053	447	2,500
Bessemer and Barry's Bay	18,864	2,505	21,369
Brandon, Saskatchewan and Hudson Bay	58,995	13,663	72,658
British Yukon	1,754	22,199	23,953
Brockville, Westport and Northwestern	7,579	14,334	21,913
Canada Southern	621,135	5,334,116	5,955,251
Can. Gov. Railways			
Intercolonial	3,157,187	395,552	3,552,739
Prince Edward Island	103,143	8,297	111,440
Canadian Northern	2,284,300	674,502	2,958,802
Can. Northern Ontario	175,051	26,245	201,296
Can. Northern Quebec	196,405	289,414	485,819
Canadian Pacific	11,617,107	4,084,169	15,701,276
Cape Breton	2,327	1,108	3,435
Caracquet	19,775	5,018	24,793
Carillon and Grenville	15	40	55
Central Ontario	139,596	91,835	231,431
Crow's Nest Southern	115,437	127,055	242,492
Cumberland Railway & Coal Co.	360,294	18,137	378,431
Dominion Atlantic	252,287	82,301	334,588
Elgin and Havelock	12,250	2,913	15,163
Eastern British Columbia	19,079	18	19,079
Grand Trunk	5,441,495	9,077,196	14,518,691
Grand Trunk (Canada Atlantic)	563,229	1,694,958	2,258,187
Halifax and Southwestern	165,555	19,508	185,063
Hampton & St. Martins	11,035	5,071	16,106
Hereford	120,933	8,049	128,982
Inverness Railway and Coal Co.	265,106	9,994	275,100
Iroquoia, Bancroft and Ottawa	28,575	3,457	32,032
Kaslo and Slocan	11,414	231	11,645
Kent Northern	3,909	4,140	8,049
Kettle River Valley	2,355		2,355
Kingston and Pembroke	69,061	30,421	99,482
Klondike Mines	6,093		6,093
Liverpool and Milton	43,773	798	44,571
London & Port Stanley	166,333	296,343	462,676
Lotbiniere & Megantic	46,176	5,851	52,027
Manitoulin and North Shore	225,445	1,207	226,652
Maritime Coal and Railway Co.	125,097	4,335	129,432
Massachusetts Valley	125,238	279,732	404,970
Midland Ry. of Manitoba	31,776	33,426	65,202
Moncton and Buctouche	28,540		28,540
Montreal and Atlantic	119,024	880,310	999,334
Montreal and Province Line	11,950	51,148	63,098
Montreal and Vermont Junction	7,055	1,001,660	1,008,715
Morrissey, Fernie and Michel	377,788	15,102	392,890
Napierville Junction Ry.	2,125	160,757	162,882
Nelson and Fort Sheppard	28,898	12,314	41,212
New Brunswick Coal and Railway Co.	46,695	19,193	65,888
New Brunswick & Prince Edward Island	26,210	8,603	34,813
New Brunswick South'n	11,618	512	12,130
New Westminster Southern	34,510	51,352	85,862
North Shore	6,762	35	6,797
Nosbonsing & Nipissing	16,310		16,310
Nova Scotia Steel and Coal Co.	5,816	1,137	6,953
Orford Mountain	30,111	5,882	35,993
Ottawa and New York	34,754	90,846	125,600
Pere Marquette (in Canada)	965,579	1,453,392	2,418,971
Philipsburg Railway & Quarry Co.	8,329	5,124	13,453

NAME OF RAILWAY.	Tonnage originating on road	Tonnage received from connecting roads & other carriers.	Total freight tonnage
Princeton Branch of Washington Co. Ry.		150,545	150,545
Quebec Central	466,098	123,529	589,627
Quebec & Lake St. John	210,615	109,854	320,469
Quebec Ry. Light & Power Co.	101,465	5,680	107,145
Quebec, Montreal and Southern	45,332	190,414	235,746
Red Mountain	49,055	33,887	82,942
Rutland and Noyan		139,362	139,362
Salisbury and Harvey	38,419	5,242	43,661
Schomberg and Aurora			
Stanstead, Shefford and Chambly	18,726	1,038,753	1,057,479
St. Clair Tunnel			
St. Lawrence and Adirondack	5,933	574,656	580,589
Sydney and Louisburg (Dominion Coal Co.)	3,341,308	115,155	3,456,463
Spokane and British Columbia Ry.	4,163	111	4,274
Temiscouata	116,866	19,509	136,375
Temiskaming & Northern Ontario	337,305	197,937	535,242
Thousand Islands	14,612	15,900	30,512
Toronto, Hamilton and Buffalo	96,422	1,137,881	1,234,303
Vancouver, Victoria and Eastern	699,053	228,883	927,936
Victoria & Sidney, B.C.	20,542	9,461	30,003
Victoria Terminal and Ferry Co.	1,240	28,702	29,942
Wabash Railway Co., in Canada	1,225,487		1,225,487
Wellington Colliery Co.	324,738	4,083	328,821
York and Carleton	6,514	2,407	8,921
Totals	36,075,101	30,754,918	66,830,019

C.P.R. Hotel Improvements.

The alterations, improvements and additions being made, or which it is proposed to go on with during the year at the various C.P.R. hotels in Western Canada are as follows:—

Banff Springs Hotel.—Work will shortly be started on an extension which will provide 30 additional rooms for guests. Besides this addition a new bathing pool, 60 by 120 ft., is being constructed, with private bath rooms and dressing rooms attached. The estimated cost of these improvements is \$80,000. This is really the beginning of the very extensive improvements contemplated.

Glacier House.—The construction of a new power plant and laundry building is being proceeded with, the estimated cost being \$12,800.

Sicamous Hotel.—In addition to the construction of a new power plant an extension, providing 25 additional rooms for guests and 10 new bath rooms, is being built. The estimated cost of the improvements is \$32,000.

Empress Hotel, Victoria.—An addition, six stories high, is being built. It will add 67 rooms for the accommodation of guests, with an additional 53 bath rooms. The contractor is L. Skene, Victoria, and the estimated cost of the work is \$136,000.

The work in each case is being done under the superintendence of the company's architect, W. S. Painter.

The Railway Committee of the House of Commons, April 7, threw out the bill introduced by A. C. Macdonnell, M.P., in respect to the granting of commutation tickets by railway companies. The object of the bill was to provide that the granting of a commutation fare could not be revoked except by the consent of the Board of Railway Commissioners, and that when one railway granted reduced rates from a central to an outside point, all other railways must do so within the same radius.

Great Northern Ry. Lines in Canada.

Midland Ry. of Manitoba.—The Winnipeg City Council has refused to adopt the plans submitted by the company for an entrance into the city, and has referred the whole matter back to the railway committee for further consideration. The principal objection to the plans was that they only provided for the erection of a freight shed, whereas the city had been led to expect that a passenger station would be provided.

At a joint meeting of the Winnipeg City Council railway committee and a number of ratepayers with L. C. Gilman, a proposition was submitted to the company that opposition to the entrance of the line, on the plans presented, would be withdrawn if provision be made for operating the line in the city by electricity. Mr. Gilman said the matter would be considered by the officials at St. Paul, Minn.

Brandon, Saskatchewan and Hudson's Bay Ry.—The Dominion Parliament has granted an extension of time for building the remaining portion of the company's projected railway.

Penticton Ry.—A company with this title has been incorporated by the British Columbia Legislature to build a railway from Penticton to the International boundary in the vicinity of Osoyoos Lake. The provisional directors are:—A. H. MacNeill, J. H. Kennedy, and E. B. Howes.

J. H. Kennedy, Chief Engineer V.V. and E. Ry., was in Oroville, Wash., April 3, for the purpose of going over the route surveyed for this projected line by — Russell. The line is to connect with the V.V. and E. Ry. at Penticton.

Vancouver, Victoria and Eastern Ry. and Navigation Co.—Work on the round-house and other divisional buildings at Princeton, B.C., the present end of track, is reported to be proceeding rapidly. Sixty acres have been reserved for yard and other purposes.

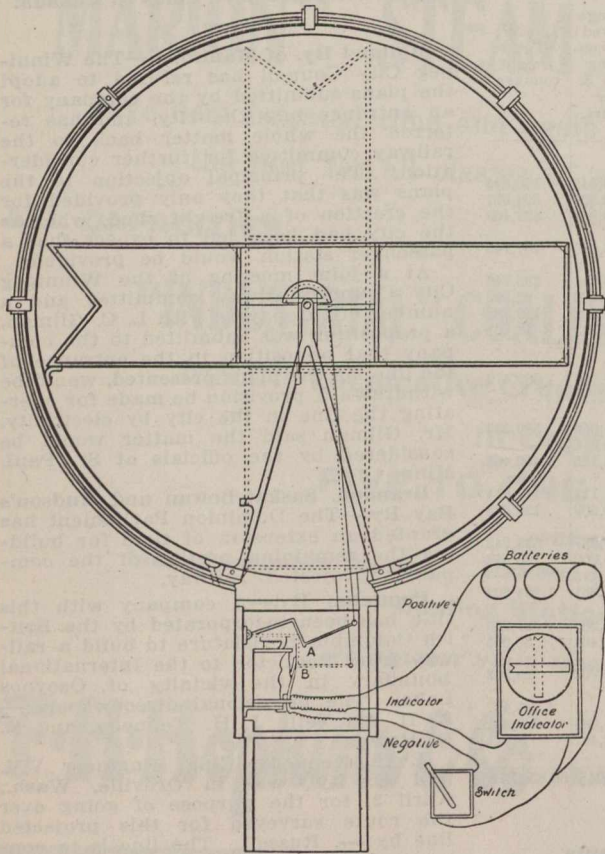
J. H. Kennedy, Chief Engineer, arrived at Keremeos, April 5, from a trip of inspection of the construction going on between Abbotsford and Hope.

An agreement was finally made April 12, between the company and the Vancouver City Council with respect to location of the proposed terminals for the Great Northern Ry. lines at the head of False Creek. The corporation assigns to the company its right to the bed of False Creek, between certain defined points, which is to be filled in by the company, and there is to be erected thereon, freight and passenger stations and terminals within five years, to cost not less than \$1,500,000. A union passenger station is to be constructed near Gore Ave., and the company releases to the corporation certain riparian rights in the bed of False Creek, east of Westminister Ave. The agreement has to be approved by the ratepayers before becoming operative.

The Provincial Engineer has written to the mayor of New Westminster, B.C., stating that the Government will not permit the Great Northern Ry., to erect a station on the grounds leased at the north end of the Fraser River bridge, until it agrees to allow the station to be used by any other railway company, which may make an arrangement with the Government to operate trains over the bridge. (April, pg. 275).

The C.P.R. is reported to have ordered 100,000 tons of steel rails from the Algoma Steel Co., Sault Ste. Marie, Ont.

Sir C. Rivers Wilson, ex-President G.T.R., speaking at the Crystal Palace Engineering School, London, Eng., April 12, said there was room for thousands of competent engineers in Canada.



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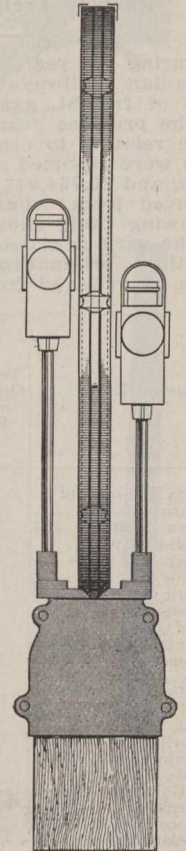
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The banner in a horizontal position signifies "STOP." When current is applied the banner comes to position of "CLEAR," or perpendicular, as shown by dotted lines; this brings lever A down, making contact with point B, which contact must be made before Office Indicator will operate, and as the Semaphore only works to "CLEAR" electrically, therefore, in case there should be any derangement of the wires, the banner instantly assumes the position of "STOP" by gravity, where it will remain until the cause of the disturbance is discovered and removed.

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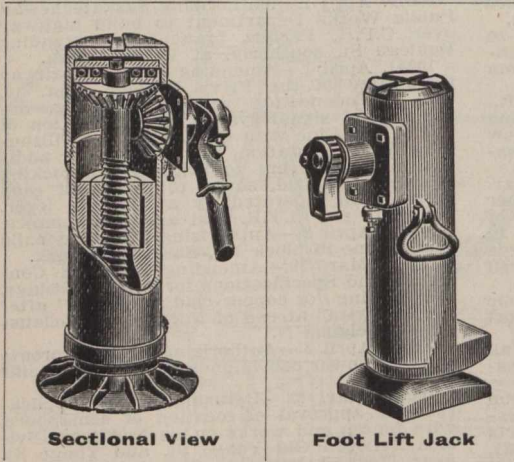
G. W. VAUX, Gen. Passenger Agent, MONTREAL

Orders by the Railway Commissioners.

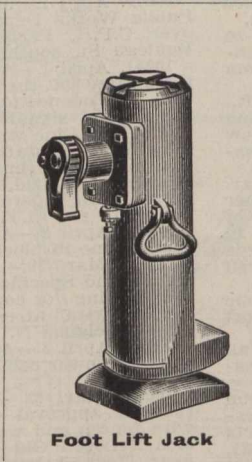
- Beginning with June, 1904, we have published in each issue summaries of orders passed by the Board of Railway Commissioners, so that subscribers who have filed our paper have a continuous record of the Board's proceedings. No other paper has done this.
- The dates given of orders, immediately following the numbers, are those on which the hearing took place and not those on which the orders were issued. In many cases orders are not issued for a considerable time after the date assigned to them.
9972. Mar. 22.—Rescinding order 7075, May 25, 1909, authorizing G.T.R. to build across highway, undergrade, between secs. 27 and 28, tp. 37, range 18, w. 3 m., West Saskatchewan District.
9973. Mar. 22.—Amending order 8685, Nov. 5, 1909, in regard to removal of C.P.R. tracks from McPhillips St., Winnipeg.
- 9974, 9975. Mar. 22.—Authorizing C.P.R. to build four spurs for North Pacific Lumber Co., New Westminster, B.C.; and one for Norcross Bros. Co., Irberville, Que.
9976. Mar. 18.—Ordering G.T.R. within 60 days to install electric bell at crossing just south of Concord station, Ont.
9977. Mar. 23.—Approving Alberta Central Ry. location from Red Deer to Rocky Mountain House, Alta.
9978. Mar. 23.—Approving Dominion Atlantic Ry. location from its junction at Centreville, N.B., to 300 ft. west of Turner Road.
9979. Mar. 22.—Authorizing Dickson Bridge Works Co. to construct two five-ton hoisting cranes across G.T.R. branch line to Northumberland Paper and Electric Co., Campbellford, Ont.
9980. Mar. 22.—Authorizing C.P.R. to open for traffic its Lacombe Branch extension from Stettler to Castor, Alta.
9981. Mar. 23.—Authorizing A. C. Beatty, M.D., Garden Hill, Ont., to place wires across G.T.R. between lots 12 and 13, con. 8, Hope tp., Ont.
9982. Mar. 23.—Authorizing Consolidated Telephone Co. to place wires across C.P.R. near Bath, N.B.
9983. Mar. 22.—Authorizing Manitoba Government Telegraphs to place wires across C.P.R. near Hartney station.
9984. Mar. 24.—Authorizing Princeton and Drumbo Telephone Co. to place wires across G.T.R. at Eastwood, Ont.
- 9985 to 9989. Mar. 22-26.—Ordering that C.P.R. be relieved from providing further protection at crossings, at mileage 7.8, between lots 20 and 21, con. 5, York tp.; between lots 12 and 13, con. 12, Sydenham tp.; at mileage 54.3, Owen Sound branch, Grey at mileage 13.7, Guelph and God-co., and at mileage 13.7, Guelph and God-co., and that G.T.R. be similarly relieved in respect of crossing two miles west of Glencoe, Ont., it appearing from inspections by the Board's Engineering and Operating Department, that the views are excellent, and proper signboards and whistling posts provided.
9990. Mar. 26.—Authorizing Trenton Electric and Water Co. to place wires across Bell Telephone Co. wires at Belleville, Ont.
9991. Mar. 22.—Authorizing Bell Telephone Co. to place wires across G.T.R. at Elgin St. Brantford, Ont.
9992. Mar. 26.—Authorizing H. E. Beach to place wires across C.P.R. at Honeydale station, N.B.
9993. Mar. 21.—Authorizing Trenton Electric and Water Co. to place wires across G.T.R. at Belleville, Ont.
- 9994, 9995. Mar. 26.—Authorizing Bell Telephone Co. to place wires across C.P.R. at Daniel St., Arnprior, and across P.M.R. at Park Ave. and Whitehall St., Chatham, Ont.
9996. Mar. 22.—Authorizing G.T.P.R. to take certain lands in Edmonton, Alta., for constructing connecting tracks and coal-transfer of cars, water station and tracks, ing plant for passenger trains, repair tracks, warehouses and other buildings and facilities necessary for traffic.
9997. Mar. 23.—Adding town of Napanee and Bay of Quinte Ry. as parties to the application re protection by G.T.R. at Centre St., Napanee, Ont.
9998. Mar. 23.—Ordering C.N.O.R. to divert road between lot 12, con. 4, and lot 13, con. 3, Scarboro tp.
9999. Mar. 23.—Approving G.T.R. plans for shelter sheds.
10000. Mar. 23.—Ordering C.P.R. to install, within 60 days, electric bell at Zorra St., Beachville, Ont.
10001. Mar. 26.—Approving Windsor, Essex and Lake Shore Rapid Ry. by-law authorizing W. T. Piggott, Managing Director, to prepare tariffs of tolls.
10002. Mar. 26.—Authorizing C.P.R. to build spur for Davenport Coal Co., Burmis, Alta.
10003. Mar. 26.—Authorizing C.P.R. to build its Regina, Saskatoon and North Saskatchewan branch across highways between mileage 0 and 14.7.
10004. Mar. 29.—Approving C.N.O.R. plan of subway on Massey Farm, lot 35, Con. B, Scarboro tp.
10005. Mar. 22.—Dismissing Elder Dempster & Co.'s application for order directing C.P.R. and G.T.R. to apply established export basis covering general merchandise shipped from Eastern Canada to Montreal, St. John, N.B., and Halifax, N.S. for export to Vancouver, Victoria and other B.C. points.
10006. Mar. 11.—Ordering C.P.R. to build highway crossing over Graham-Grinton Road, 1½ miles south of Armstrong, B.C.
10007. Mar. 26.—Authorizing C.P.R. to cross highways with its Snowflake extension and spur to International boundary from mileage 9.2 to 15.9, Man.
10008. Mar. 26.—Authorizing C.P.R. to build its Virden-McAuley branch across highways between mileage 0 and 14, Man.
10009. Mar. 26.—Authorizing C.P.R. to build across all highways on its Teulon extension from mileage 56.55 to 73.88, from Rugby Jct., Man.
10010. Mar. 21.—Ordering that C.P.R., G.N.W., and Canadian Northern Telegraph Companies file, not later than Apr. 12, new tariffs covering telegraphic services to newspapers.
10011. Mar. 29.—Amending order 9854, Mar. 11, relieving G.T.R. from providing further protection at crossing one mile south of Caldwell, Ont., and G.T.R. application to amend same by striking out the words Caldwell and Grey and substituting Colwell Jct. and Simcoe.
10012. Mar. 29.—Authorizing Bell Telephone Co. to place wires across London & Port Stanley Ry. at Ottawa Ave., London, Ont.
10013. Mar. 29.—Ordering G.T.R. to install within 60 days an electric bell at its crossing of Canfield St., Belleville, Ont.
10014. Mar. 29.—Authorizing Hamilton Powder Co. to ship by railway in its present packages, which do not in all respects comply with the requirements of order 7881, Aug. 27, 1909, explosives now on hand in its magazines at Nanaimo, Vancouver, Cranbrook and Nelson, B.C.
10015. Mar. 30.—Authorizing C.P.R. to build branch near Marysville station on lot 2377, group 1, Kootenay District, B.C.
10016. Mar. 30.—Approving Essex Terminal Ry. Standard Freight Tariff, C.R.C. 37.
10017. Mar. 26.—Authorizing C.P.R. to build across and to divert highways on its Lethbridge-Aldersyde branch from mileage 0 to 28, Alta.
10018. Mar. 30.—Authorizing G.T.R. to build spur to I. J. Rank's premises, Hagersville, Ont.
10019. Mar. 30.—Approving agreement between Woodbridge and Vaughan Telephone Co., Bell Telephone Co. and Union Telephone Co.
10020. Mar. 30.—Authorizing C.N.O.R. to divert and cross overhead road between lots 20 and 21, con. 2, Scarboro tp., station 499-50.
10021. Mar. 31.—Authorizing C.N.O.R. to build across public road between lots 18 and 19, con. 4, Pickering tp.
10022. Mar. 25.—Ordering that cost of operating and maintaining gates at M.C.R. crossing just west of Comber station, Ont., be paid, 10% by the township and balance by the company.
10023. Mar. 30.—Ordering that G.T.R. be relieved from providing further protection at crossing 1½ miles south of Lacolle Jct., Que., it appearing from inspection made by the Board's Engineer and Operating Department, that view is excellent and that signboards and whistling posts are properly placed.
10024. Mar. 22.—Adding Peel county and Toronto tp., as parties in matter of protection at G.T.R. crossings at Port Credit, Ont.
10025. Mar. 22.—Adding Oxford county as party in matter of protection at G.T.R. crossing just east of Beachville station, Ont.
10026. Apr. 1.—Approving C.N.R. location through tps. 5-6, r. 11-18, w. 2 m., Sask., mileage 95.58 to 147.14, from junction at Maryfield.
10027. Mar. 31.—Authorizing C.P.R. to build spur to H. N. Sereth's premises at mileage 15.04, east of Cranbrook, B.C.
10028. Mar. 26.—Authorizing C.P.R. to build across all highways on its Weyburn-Lethbridge branch from mileage 0 to 26.2.
10029. Mar. 31.—Authorizing Montreal & Atlantic Ry. (C.P.R.) to divert highway crossing in Sweetsburg, Que.
10030. Mar. 24.—Rescinding order 9782, Feb. 21, 1910, in connection with Bell Telephone Co.'s refusal to connect with West Williams Telephone Co. at Parkhill, Ont.
10031. Mar. 31.—Authorizing G.T.R. to build bridge carrying farm crossing at lot 2, con. 1, Fullerton tp., Ont.
10032. Mar. 31.—Amending order of Railway Committee of the Privy Council respecting interlocking, derailing and signal system at intersection of G.T.R. with C.P.R., four miles west of Chatham, Ont., by approving the addition of a four lever section to the original interlocking machine.
10033. Mar. 31.—Approving stress sheet for bridges 17, 18, and 20, being highway crossings adjoining Soulanges canal, Que.
10034. Mar. 31.—Ordering the G.T.R. within 60 days to install electrical bell at crossing just west of Rockwood station, Ont.
- 10035, 10036. Mar. 31.—Authorizing J. A. Coleman, Winger, Ont., to lay gas pipe under G.T.R. 4½ miles west of Marshville, and under M.C.R., at Montague station.
10037. Mar. 31.—Authorizing Canadian Niagara Power Co. to place wires over International bridge and G.T.R., at Bridgeburg, Ont.
10038. Mar. 31.—Authorizing C.P.R. to build spur for P. Burns & Co., between Golden and Morrow Aves., Toronto.
10039. April 1.—Authorizing Chatsworth Rural Telephone Co. to place wires across C.P.R. near Chatsworth station, Ont.
10040. April 1.—Authorizing Saskatchewan Public Works Department to build highway over C.P.R. Pasqua branch, by extending Rouleau St. southerly, at Wilcox, Sask.
10041. April 1.—Amending order of Railway Committee of the Privy Council, Sept. 10, 1895, in connection with interlocking, derailing and signal system at intersection of G.T.R. Air Line with C.P.R., east of Tillsonburg Air Line station, by providing for addition of two levers to original interlocking machine installed, so as to permit of each derail being operated by a separate lever, C.P.R. to pay G.T.R. cost and maintenance.
10042. April 2.—Authorizing C.P.R. to build branch line in block 165, Saskatoon, Sask.
10043. Mar. 29.—Amending Standard Conditions and Specifications for Wire Crossings, by inserting "or copper-clad steel wire" after "copper wire" at end of third line sub-clause (Na) in clause N.
10044. April 2.—Authorizing city of Toronto to place power cables under G.T.R. on Pacific Ave.
10045. Mar. 22.—Refusing G.T.R. application for approval of location of semaphore, wire fences and works on its Northern Division between Old Yonge St. and Yonge St. near Holland Landing, Ont., with leave to parties interested to renew application upon usual notice.
10046. Mar. 22.—Rescinding order 7706, Aug. 3, as amended by order 8079, Sept. 14, 1909, authorizing G.T.R. to build spur to Davis & Doty's premises, Oakville, Ont.
10047. Mar. 22.—Relieving C.P.R. from providing further protection at crossing on Dundas St., Lambton, Ont., it appearing from inspection made by the Board's Engineer and Operating Department, that views are excellent and that signboard and whistling posts are properly placed.
10048. Mar. 22.—Rescinding order 8055, Sept. 13, 1909, authorizing G.T.R. to build spur to Shields & Hilmer's premises, Oakville, Ont.
- 10049, 10050. April 1 and 2.—Relieving G.T.R. from providing further protection at crossings at second highway east of station at Upton Road, Que., and 1¼ miles south of Moorefield station, Ont., it appearing from inspections made by the Board's Engineer and Operating Department that the views are excellent and that signboards and whistling posts are properly placed.
10051. April 2.—Authorizing C.P.R. to build spur line at mileage 27.62, Woodstock section, for Hon. J. K. Fleming, Woodstock, N.B.
10052. Apr. 2.—Approving G.T.P.R. road diversion in s. w. sec. 1; tp. 44, r. 4, w. 4 m., North Alberta District.
10053. Apr. 2.—Ordering G.T.R. to install within 60 days an electric bell at crossing just east of Maxville station, Ont.
10054. Apr. 1.—Relieving C.P.R. from providing further protection at the crossing at mileage 27.5, Teeswater branch, Arthur tp., Ont., it appearing from inspection made by the Board's Engineer and Operating Department, that views are excellent and that signboards and whistling posts are properly placed.
10055. Mar. 22.—Ordering M.C.R. to provide protection at Tillson Ave. crossing, Tillsonburg, Ont.
- 10056, 10057. Apr. 2.—Authorizing Bell Telephone Co. to place wires across G.T.R. at Daniel and John Sts., Arnprior, Ont.
10058. Apr. 2.—Authorizing J. Sidey, to place wires across G.T.R. just north of Garden Hill, Ont.
- 10059, 10060. Apr. 2.—Authorizing Ontario Power Co. to place wires over G.T.R. on Welland and King Sts., Port Colborne, Ont.
10061. Apr. 1.—Relieving G.T.R. from providing further protection at crossing of second highway east of Stanfield station, Que., it appearing from inspection made by the Board's Engineer and Operating Department, that views are excellent and that signboard and whistling posts are properly placed.
10062. Apr. 5.—Authorizing G.T.R. to construct spur lines from its Northern Division, south of Bloor St., Toronto, to Fairbanks Morse Canadian Mfg. Co.'s premises.
10063. Apr. 5.—Ordering G.T.R., within 60 days to install electric bell at Laggan Road crossing, Alexandria, Ont.
10064. Apr. 5.—Extending until July 31, time within which C.P.R. should construct spur for city of Winnipeg, near Birdhill station.

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Sectional View



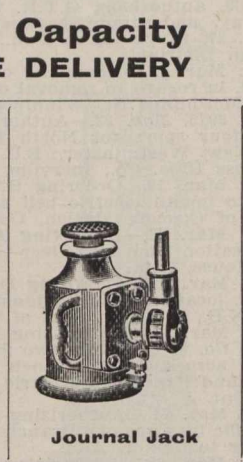
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10065, 10066. Apr. 4 and 5.—Authorizing C.N.O.R. to cross highway between lots 8 and 9, con. 3, and between lots 14 and 15, con. 4, Hope tp.

10067. Apr. 5.—Authorizing Dr. A. C. Beatty, Garden Hill, Ont., to place wires across C.N.O.R. in Hope tp.

10068 to 10072. Apr. 5.—Authorizing Bell Telephone Co. to place wires across C.P.R. at five points in Ontario and Quebec.

10073. Mar. 25.—Refusing E. N. Richards' application for order directing G.T.R. to provide farm crossing at lot 102, con. 1, Sandwich East tp., Ont.

10074. Apr. 5.—Amending order 8627, Oct. 21, 1909, by substituting "Railway" for "Applicant" where it appears in lines 7 and 11 of preamble in first and second paragraphs of operative part and in conditions 2 and 10; and by adding "Railway" before "Company" where the latter appears in conditions 3, 4, sub-section 3 of conditions 4, 5, 7, 8 and 9.

10075. Apr. 6.—Ordering G.T.R., within 60 days to install electric bell at crossing just east of Breslau station, Ont.

10076. Mar. 15.—Refusing application of P. C. Larkin Co., Toronto, for lower rating in the Canadian Classification for packet tea, boxed, than for bulk tea, boxed.

10077. Mar. 22.—Ordering G.T.R., within 60 days to put approaches at crossing allowance for road between con. 7 and 8, Esquesing tp., on both sides in condition to comply with Board's General Regulations Affecting Highway Crossings of Jan. 26, 1909.

10078. Apr. 6.—Authorizing Metcalfe Rural Telephone Assoc. to place wires across O. & N.Y.R. at Edwards station, between Osgoode and Gloucester tps., Ont.

10079 to 10081. Apr. 6 and 7.—Authorizing Canadian Niagara Power Co. to place wires across Bell Telephone Co.'s wires at three points in Ontario.

10082. Apr. 6.—Ordering G.T.R., within 60 days to install electric bell at first crossing east of Mallorytown, Ont.

10083. Apr. 5.—Relieving G.T.R. from providing further protection at crossing 1½ miles east of St. Basile le Grand station, Que.

10084. Apr. 6.—Approving Alberta Ry. and Irrigation Co.'s by-law respecting spitting in cars stations, etc.

10085. Apr. 5.—Authorizing Ontario Hydro-Electric Power Commission to place transmission lines across Niagara, St. Catharines and Toronto Ry. in Thorold tp.

10086. Apr. 7.—Ordering C.N.Q.R. to provide farm crossing for M. Francoeur, St. Jerome parish.

10087. Apr. 7.—Ordering G.T.R. to install within 60 days, electric bell at first highway crossing west of Norval station, Ont.

10088. Apr. 5.—Authorizing C.N.O.R. to build across public road between lot 25, con. 2, and lot 25, con. 3, Pickering tp.

10089. Apr. 5.—Relieving G.T.R. from providing further protection at crossing at Third Line north of Stottsville, Que.

10090. Apr. 7.—Amending order 9973, Mar. 22, 1910, by striking out "November" in second line of operative part and substituting "February."

10091. Apr. 7.—Approving C.N.O.R. plan of standard crossing over highways, frame, trestle and beam span.

10092, 10093. Apr. 5.—Relieving G.T.R. from providing further protection at crossing west of St. Madelene, Que., and crossing third, east of Upton station, Que.

10094. Apr. 5.—Authorizing C.N.O.R. to build across road between cons. 2 and 3, Hope tp., station 392-19.

10095. Apr. 6.—Relieving C.P.R. from providing further protection at crossing immediately east of Mountain Grove station, Ont.

10096. Apr. 7.—Approving C.N.O.R. plan of standard crossing over highways, pile, trestle and beam span.

10097, 10098. Apr. 7.—Relieving G.T.R. from providing further protection at crossings three miles west of Stamford, and just east of Walsh, Ont.

10099. Apr. 6.—Approving protection provided by G.T.R. at crossings at Cherry St., Spadina Ave., High Park Entrance East, Humber Bay and Swansea, Toronto; Shoebottom's crossing, about 4 miles west of St. Marys Jct.; Queen St., Brampton; first crossing west of Burlington Jct.; first crossing east of Paris Jct.; first crossing east of Wvoming; Plank Road, Sarnia, Ont.

10100. Mar. 15.—Amending order 6147, Jan. 21, 1909, which fixes a stop-over charge of 25c. per car a day for the first 48 hrs., and car service toll thereafter, on western grain and grain products in car loads consigned to Cartier and Sarnia Tunnel, Ont., by striking out "25 cents" in the 13th line of operative part and substituting "\$1."

10101 to 10103. Apr. 7.—Relieving G.T.R. from providing further protection at the crossings at mileage 113.75, east of New Sarum and east of Wainfleet station, and just east of Sherkston station, Ont.

10104 to 10116. Apr. 9.—Authorizing Ontario Hydro-Electric Power Commission to place telephone and relay wires across various railways at 13 points.

Railway Rolling Stock Notes.

The G.T.R. has received six mogul locomotives from the Canadian Locomotive Co., Kingston, Ont.

The Michigan Central Rd., has received one hump switching, and 10 consolidation locomotives from the Montreal Locomotive Works.

The Portland Canal Short Line Ry has bought two locomotives in the U.S. for construction work and has ordered one combination passenger car and caboose and 23 flat cars from the Canadian Car and Foundry Co.

The Canadian Northern Ry., between Mar. 15 and Apr. 15, received the following additions to rolling stock, 25 cabooses, 30 flat cars from the Crossen Car Mfg. Co., Cobourg, Ont., and 125 box cars from the Canadian Car and Foundry Co., Montreal.

The 10 consolidation locomotives which the C.P.R. is having built at the Montreal Locomotive Works, some details of which we gave in our April issue, are, we are advised, similar in all respects to the locomotive described and illustrated on pgs. 165-175 of our March issue.

The 1,000 steel frame box cars which the C.P.R. has ordered from the Canadian Car and Foundry Co., Montreal, are to be exact duplicates of the cars described and illustrated in our Jan. issue, except that Farlow draft gear will be used in place of the M.C.B. twin springs.

The C.P.R., between Mar. 18 and Apr. 13, received the following additions to rolling stock:—six D-10 locomotives, four baggage and express cars, one mail and express car, 67 wooden box cars, five vans, and one pile driver from its Angus shops, Montreal; 249 steel frame box cars from the Canadian Car and Foundry Co., Montreal, and one 3-ton travelling derrick from England.

The C.P.R., between Mar. 18 and Apr. 13, ordered rolling stock, as follows:—two first class cars, 76 wooden box cars, 203 refrigerator cars, 50 palace horse cars, 14 stock cars, 25 flat cars, five vans and one ballast car, at its Angus shops, Montreal; 1,000 steel frame box cars from the Canadian Car and Foundry Co., Montreal, and one 75-ton wrecking crane in the U. S.

The Temiskaming and Northern Ontario Ry., has ordered three parlor-cafe cars from the Canadian Car and Foundry Co., Montreal, which it is said are the first all steel under-frame passenger cars to be built in Canada, and of which the following are the chief particulars:

Length over vestibule buffer plates	80' 3 3/4"
Length over side sill angles	7' 3 1/2"
Width over side sill angles	9' 8 1/2"
Width over wide side sills	9' 10 5/8"
Width overall at eaves	10' 3 1/4"
Width at deck opening between deck sills	5' 6"
Height from rail to under side of side sill angles	3' 7 1/2"
Height from rail to top of roof boards	14' 1 1/2"
Distance centre to centre of trucks	51' 10"
Truck wheel base	11' 0"
Underframe, posts and carlins	Structural steel
Couplers	Tower steel
Platforms	Standard steel
Heating	Gold combination steam and hot water
Lighting	Pintch gas
Air brakes	Westinghouse LN 1812, with L3 triple supplementary reservoir and slack adjuster
Trucks	All steel, 6 wheel
Wheels, diar.	36"
Journals	5" by 9"
Journal bearings	Canadian Bronze Co.
Brake shoes	Amerian steel back

Following are the chief particulars of the 11 ten-wheel locomotives, class D-10, which the C.P.R. is building at its Angus shops, Montreal, as mentioned in our April issue:—

Weight on drivers	141,000 lbs.
Weight, total	190,000 lbs.
Cylinders, diar. and stroke	22 1/2" by 28"
Drivers, diar	63"
Boiler, type	Radial stayed, wagon top
Boiler, pressure	180 lbs.
Heating surface, tubes	2,263 sq. ft.
Heating surface, superheater	408 sq. ft.
Heating surface, firebox	190 sq. ft.

Tubes, no. and diar.	24-5"	244-2"
Tubes, length	14' 6"	14' 6"
Firebox	100 7/8"	by 69 3/4"
Grate area	49 sq. ft.	10 tons
Capacity, water	5,000 gals.	
Capacity, coal	10 tons	
Air brakes	Westinghouse ET 6	
Brake shoes	C.P.R. standard	
Brake beams	Simplex diamond, inside hung	
Couplers	Tower	
Headlight	Pyle National Electric	
Journal bearings	C.P.R. standard	
Lubricators	Detroit 5-feed	
Springs	C.P.R. crucible steel	
Wheel tires	Crucible steel	
Wheel centres	Cast steel	
Traction effort	34,400 lbs.	

The Minneapolis, St. Paul and Sault Ste. Marie Ry., has recently received four Pacific type and four consolidation locomotives from the American Locomotive Co., of which the following are the chief particulars:—

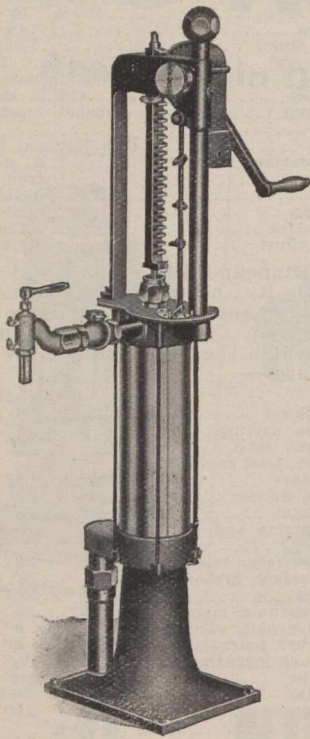
	Pacific	Consolidation.
Traction power	30,800 lbs.	40,500 lbs.
Wheel base, driving	12' 0"	17' 0"
Wheel base, total	32' 2"	26' 0"
Wheel base, total engine and tender	59' 10 1/4"	57' 1-1/4"
Weight on drivers	145,000 lbs.	192,500 lbs.
Weight, total	217,000 lbs.	220,000 lbs.
Weight, engine and tender	343,000 lbs.	347,000 lbs.
Heating surface, tubes	2,695 sq. ft.	2,971 sq. ft.
Heating surface, firebox	181 sq. ft.	187 sq. ft.
Grate area	47 sq. ft.	52.7 sq. ft.
Driving journals, main	10" by 12"	10" by 12"
Driving journals, others	9" by 12"	9" by 12"
Engine truck journals	6" by 10"	6" by 12"
Tender truck journals	5-1/2" by 10"	5-1/2" by 10"
Boiler, type	Extended wagon top.	
Boiler, diar.	70"	76-1/4"
Boiler, pressure	160 lbs.	160 lbs.
Firebox	96-1/8" by 70-1/4"	108-1/8" by 70-1/4"

Tubes, no. & diar.	217-2"	24-5-1/4"	30-5-1/4"
Tubes, length	18' 6"	15' 6"	15' 6"
Brakes	Westinghouse	American.	
Capacity, water	6,500 gals.	6,500 gals.	
Capacity, coal	10 tons.	10 tons.	
Wheels, driving	69"	63"	
Wheels, material	Cast steel.	Cast steel.	
Wheels, engine truck	33"	33"	
Wheels, trailer	46"		
Wheels, tender	33"	33"	

Following are the chief particulars of the 10 Pacific type locomotives which the G.T.R. is building at its Point St. Charles shops, Montreal, as mentioned in our April issue:—

Traction power	31,559 lbs.
Weight in working order	210,000 lbs.
Weight on drivers	139,000 lbs.
Weight, engine and tender	353,800 lbs.
Wheel base, driving	13' 4"
Wheel base, total engine	33' 2"
Wheel base, engine and tender	62' 3 1/2"
Length overall	72' 3"
Cylinders, diar and stroke	22" by 28"
Driving wheels	73"
Driving wheel centres	Cast steel
Boiler, type	Wagon top with wide firebox
Boiler pressure	200 lbs.
Boiler, diar	66"
Tubes, no. and diar	309-2"
Tubes, length	20' 6"
Heating surface, tubes	3,340 sq. ft.
Heating surface, firebox	169 sq. ft.
Grate area	50.62 sq. ft.
Tender, total weight	148,800 lbs.
Capacity, water	7,000 gals.
Capacity, coal	10 tons
Brakes	Westinghouse ET
Weight on drivers ÷ tractive effort	= 4.1.
Total Weight ÷ tractive effort	= 5.5.
Tractive effort x diar. of drivers ÷ heating surface	= 96.1.
Heating surface ÷ grate area	= 46.1.
Heating surface firebox ÷ heating surface without superheater	= 11.9.
Weight on drivers ÷ total heating surface	= 52.8.
Total weight ÷ heating surface	= 84.
Heating surface ÷ vol. cylinders	= 175.

An agreement was reported to have been reached April 15, between the Temiskaming and Northern Ontario Ry. Commission and the G.T.R., for the use by the latter of the T. and N.O. Ry. terminals at North Bay, for 21 years, the Commissioners reserving the right to make similar agreements with the C.P.R. and the C.N.R. The Commission proposes to build a short piece of line between North Bay and Nipissing Jct., 2.5 miles, so as to secure a connection with the G.T.R., independent of the C.P.R.



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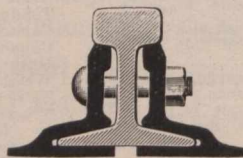
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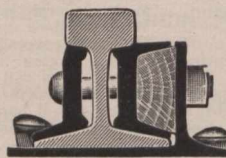
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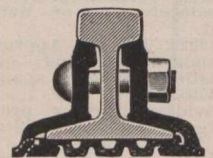
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Canadian Northern Ry. Construction, Etc.

W. Mackenzie, President, in a recent interview in London, Eng., stated that in Ontario the company's line from Toronto to Ottawa, will be finished as far as Trenton, Ont., about 100 miles, by the fall; and progress would be made with the line from Toronto in the opposite direction. On the northern section the end of steel is about 60 miles beyond Sudbury. On the Western prairies about 600 miles in all will be added to the company's lines. Construction will be gone on with on the line from Edmonton to the Yellowhead Pass, 240 miles. This year will also see the beginning of the new line of 500 miles across British Columbia, from the Yellowhead Pass to Vancouver. Further progress would be made with the line to Hudson Bay, and he confidently expected that the line would be in operation within three years.

Canadian Northern Quebec Ry.—The Quebec city council decided, April 15, to serve a notarial protest on the company calling on it to reimburse the city for the \$200,000 voted to the Great Northern Ry. (one of the companies taken over) upon certain conditions which, it is claimed, are not being observed. One condition was the location of the company's workshops in the city. The question has been discussed on several occasions, but no definite understanding can be reached.

G. Tombs, General Freight and Passenger Agent, is reported to have said in Montreal, April 14, the matter of a new terminal there had been under consideration for some time, but as it was an undertaking of considerable magnitude, a decision could not be arrived at in too great haste. There were a good many developments going on in connection with railway matters in the city, and it was impossible to say what would be the outcome.

Canadian Northern Ontario Ry.—A start has been made in tracklaying on the line now under construction between Toronto and Ottawa—the contractor for the first section of which is Angus Sinclair. The tracklaying was done in the vicinity of Trenton, at the point of crossing the Central Ontario Ry. The connection has been made for the purpose of bringing in ties. Track had also been laid from points on the old Midland Ry. of the G.T.R., about a mile north of Scarboro Jct., in order to bring supplies to the construction gangs. Rapid progress is being made with the grading from the Don Valley, and through Scarboro tp. A steam shovel is at work just east of the Kennedy Road, where there is a big cutting, the earth from which is being used on an adjoining farm where there is a big fill. At the point where the line will run under the G.T.R. at Scarboro Junction, 20 ft. below the G.T.R. tracks, there are several gangs at work, as it is a point where the supplies, etc., are brought in off the G.T.R. Grading is also well advanced in Pickering and Whitby tps., as well as in Durham county, and right through to Trenton. All along the route, in addition to the regular gangs of men, the sub-contractors have taken on all the farmers' teams that could be hired, in order to push forward the work as rapidly as possible. Culvert and bridge work is light, and generally speaking the work is easy. It is expected that a contract for a further section of the line easterly from Trenton will be let at an early date. A Trenton press report states that L. D. Barchfield has been securing options on land for right of way into Belleville, Ont.

With reference to matters in Toronto, the reports as to the intentions, not only of the C.N.O.R., but also of the other companies, are as wild as they are numerous and contradictory. The recent large purchases of property, together with the unsatisfactory conditions gen-

erally, point to the fact that the whole railway situation in Toronto is likely to undergo a change. What the outcome will be it is impossible to tell, the only thing that is certain is that the Mackenzie, Mann & Co. interests will not be satisfied with having to take the subordinate position they have to do in the present Union Station.

Referring to the location of the company's shops in Toronto, D. D. Mann, Vice President, said, April 14, that shops would be built in Toronto, but whether in the Ashbridge Bay district or not he would not say. No progress had been made in the negotiations with the city council on the subject. The Riverdale Business Mens' Association passed a resolution, April 12, asking the city council to grant the company the right of way asked for on the east side of the Don, so that the shops could be located in the Ashbridge Bay district.

The party, of which G. F. Hanning was in charge, completed its survey of the route of the proposed line from Toronto to Buffalo, along the right of way of the Toronto and Niagara Power Co., as far as Niagara Falls, April 8. From the point where the power line crosses the Niagara Falls town boundary the route will diverge and pass through the centre of the city to the river about 300 feet north of the upper steel arch bridge. Surveys have been made for the erection of a bridge there.

Ontario and Ottawa Ry.—The Dominion Parliament incorporated a company with this title, with the powers, etc., mentioned in our March issue, pg. 183.

James Bay and Eastern Ry.—The bill referred to in our March issue, pg. 183, for the incorporation of a company with this title, has been passed by the Senate.

Canadian Northern Ry.—In an interview at Port Arthur, April 9, General Manager McLeod is reported to have stated that the company intended to do a large amount of work during the summer, not only on the main line, but also on the Duluth extension. The work on the Slate River-Kashabowie division will be completed in about two months; this will cut down the gradients out of Port Arthur very materially, and will shorten the line between Port Arthur and Kashabowie. Some of the bridges will also be rebuilt. Long sidings are being built along the line between Port Arthur and Winnipeg, about every four miles, and as soon as the necessity arises these can be coupled up and a second track provided. So far as Port Arthur itself was concerned additions would be made to the terminals; stalls added to the existing roundhouse; the yards rearranged and new tracks laid down, and a new freight shed will be built on the dock as soon as the rail business was over.

The bridge at Rainy Lake was so badly damaged at the break-up of ice, that it was considered unsafe, April 3, and traffic was diverted over the C.P.R. pending the strengthening of the structure. The erection of a steel bridge is under consideration, but so many interests are involved that the plans have not been finally decided on. The matter is under the consideration of the Dominion Government, the bridge being across a navigable channel.

We are advised that the Dominion Bridge Co. expects to commence the erection of the steel work of the new bridge over the Red River at Winnipeg as soon as the spring floods are over. The manufacture of the steel is well forward at the company's works, Lachine, Que.

Plans for the construction of a transfer railway in Brandon, Man., have been under discussion between the company's officials and the city council, and an offer was made to construct such a line with certain industrial spurs provided, it was allowed to operate a street railway over the lines so constructed. The council

passed a resolution, April 4, asking the company to go ahead with construction, offering to provide a right of way, to arrange for a connection with the C.P.R., but expressing the opinion that the city should own the plant required for the operation of the street railway lines.

In our last issue, in referring to the company's construction programme for this year, we spoke of "the Rossburn branch, from Neepawa, Man., which is intended to connect with the main line at Dauphin, Sask." Canora should have been mentioned instead of Dauphin, which is in Manitoba.

In an interview recently at Winnipeg, R. J. Mackenzie stated that the construction programme for the year in Manitoba, Saskatchewan and Alberta, would include work on the following lines:—The extension of the Oak Point line northerly; the extension of the Rossburn branch to a connection with the line to Edmonton near Tiny, Sask., the extension of the Thunderhill branch; the continuation of the Maryfield extension towards Lethbridge, Alta.; the continuation of the Goose Lake line towards Edmonton; the extension of the line from Prince Albert towards Battleford; the continuation of the line from Vegreville to Calgary, the construction proposed being from Stettler to Calgary, Alta.; and the extension of the Edmonton and Slave Ry., now ending at Morinville, north-westerly towards Athabasca Landing. Work was started on several of these lines last year, and the contractors have still some work in hand on them to go on with.

We are officially advised that contracts have been let as follows:—For the completion of the Vegreville-Calgary line and a further extension of about 15 miles on the Saskatoon-Calgary line to the Northern Construction Co., Winnipeg; for a further extension of 50 miles on the Maryfield line, and for a branch running north-westerly from Maryfield towards Moose Jaw, 50 miles, to the Cowan Construction Co., Winnipeg.

Tracklaying is reported to be completed for 40 miles on the Vegreville-Calgary line, and is being proceeded with. The telegraph line is being strung, and the work generally is being pushed. Surveys are reported to have been completed by a party working under J. G. Mackenzie, for a line from Strathcona to Camerose, on the Vegreville-Calgary line, about 45 miles, and a press report states that construction will be gone on with this year. It is also reported that surveys have been completed for a line from Strathcona, west of the Calgary and Edmonton Ry. as far as Pigeon Lake.

The surveys have been completed for the main line for a spur at the Yellowhead Pass, under the charge of — Hughes; he having effected a junction with C. P. Harrington, who is in charge of the survey party working easterly from Kamloops, B.C.

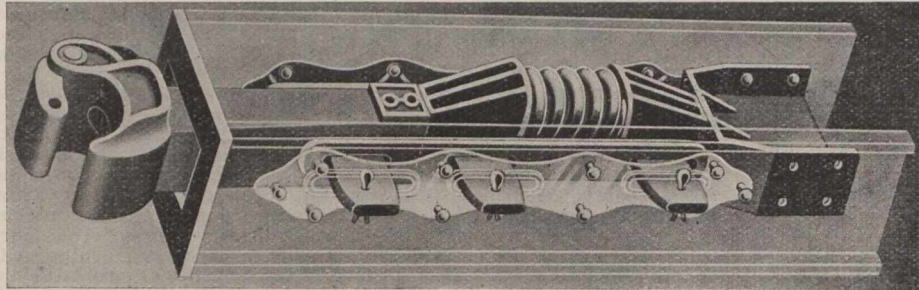
Winnipeg Station.—A press dispatch from Winnipeg Apr. 21, says that the contract for the interior finishing of Fort Garry station, has been let to the general contractors for the erection of the buildings, to Lyall & Sons for about \$300,000, which will make the total cost of the station building about \$1,300,000. The work is to be completed by Oct. 1.

Saskatchewan Midland Ry.—Application is being made to the Board of Railway Commissioners to sanction an agreement amalgamating the S.M. Ry. with the C.N. Ry.

Edmonton and Slave Lake Ry.—The Dominion Parliament has granted an extension of time for the construction of this projected railway.

Canadian Northern Pacific Ry.—The British Columbia Legislature has incorporated a company with this title with power to build a railway with a connection with the Canadian Northern Ry. at the eastern boundary of the province, to

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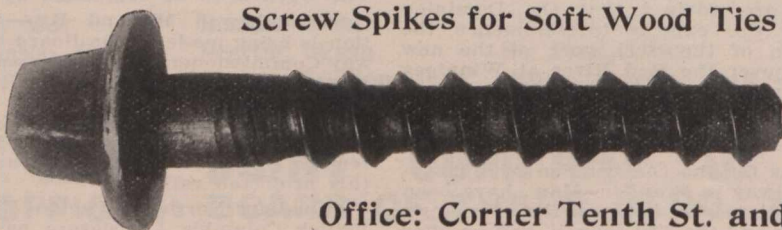


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New Westminster, thence to Vancouver, and also to English Bluff, south of the Fraser River, a distance of approximately 500 miles. The route to be followed is specifically described as being via the Yellowhead Pass, and the valleys of the North Thompson, South Thompson and Fraser rivers. The company is also authorized to construct a line from Victoria to Barkley Sound, about 100 miles; and such other lines as may be authorized by the Lieut.-Governor in council. The company is given the general powers usually conferred upon railways; its capital is fixed at \$25,000,000, of which \$10,000,000 may be preferred stock; and it may issue bonds or other securities to the amount of \$60,000 a mile, exclusive of any bonds issued for terminal facilities, elevators, etc. The provisional directors are:—W. Mackenzie, D. D. Mann, D. B. Hanna, A. D. Davidson, Toronto, and R. J. Mackenzie, Winnipeg.

The Legislature has also confirmed an agreement with the Canadian Northern Ry. for the construction of the lines mentioned above. The second section of the act provides that the C.N. Pacific Ry. Co., when organized, can proceed to implement the agreement. In consideration of the construction of the lines as previously mentioned, the Government guarantees the company's bonds for \$35,000 a mile at 4%, for 30 years, the total mileage not to exceed 600 miles, except under the following circumstances:—The company will endeavor to bring its line into Kamloops, either by diverting its main line so as to run through the city, or by the construction of a branch upon completion of this connection, the guarantee will be extended to cover the additional mileage occasioned by such construction. Among the covenants entered into by the company are the following:—to establish telegraph and telephone lines; to operate a car ferry service between English Bluff and Victoria; to build the lines to the standard of the C.N.R. between Winnipeg and Edmonton; to provide adequate rolling stock; to pay current rates of wages on constructions; to purchase supplies as far as possible in British Columbia; to begin construction not later than July 1, near New Westminster and Victoria, and to complete the same by July 1, 1914; to establish roundhouse, car repair shops, etc., for the Barkley Sound line within three miles of Victoria; and to maintain adequate terminal facilities at Vancouver and Victoria. The bonds guaranteed are to be disposed of and the money paid to a special account to the credit of the Finance Minister of the Province, on whose order it shall be paid from time to time to the company in proportion to the work done. In the event of the company purchasing any constructed line, the mileage so purchased to be calculated as constructed mileage for the issue of securities. It is agreed that neither the C.N. Pacific Ry. nor the C.N. Ry. shall make application to have these lines declared to be for the general advantage of Canada. This is for the purpose of carrying out section 8, which gives the B.C. Government power to regulate rates on these lines.

The surveys between Kamloops, B.C., and the boundary near the Yellowhead Pass have been completed, and good progress has been made with the surveys from Kamloops to New Westminster.

The first piece of construction to be undertaken, it is expected will be from New Westminster to English Bluff, from which point a car ferry service is to be maintained with Victoria. The company will, it is said, lay out a townsite on the south bank of the Fraser River opposite New Westminster. It is expected that the line from New Westminster easterly to Hope will be under contract by June 1, and that soon afterwards construction will be started at Kamloops, gangs work-

ing therefrom north and south. On Vancouver Island it is expected that work will also be started this year in building the line from Victoria to Quatsino Sound. The whole of these lines have to be completed, according to the agreement with the B.C. Government, by 1914.

Portland Canal Short Line.—The steel for this line is reported to have been delivered at Stewart, B.C., and it is said that construction is to be started at once. This proposed line starts from the Stewart townsite in Northern British Columbia, and will follow the Bear River valley for about 15 miles, to some mining properties which are being developed by D. D. Mann. W. H. Grant, of Mackenzie, Mann & Co.'s staff, Toronto, left April 12, for Stewart to act as Superintendent of Construction. He was accompanied by D. O. Lewis, and a regular staff. (April, pg. 285.)

Railway Commissioners' Traffic Orders.

Summaries of other traffic orders are given on another page under "Orders by Railway Commissioners":—

STOP OVER CHARGES "FOR ORDERS."

10100. Mar. 15.—The application of the C.P.R. and G.T.R., under section 29 of the Railway Act, for order amending the order 6147, Jan. 21, 1909, fixing a stop, 25c. per car a day for the first 48 hours, and the car service toll thereafter, on western grain and grain products, in car loads, consigned to Cartier and Sarnia Tunnel, Ont., "for orders." Upon hearing the application in the presence of representatives of the Dominion Millers' Association, the Canadian Manufacturers' Association, the Montreal Corn Exchange, the C.P.R., the G.T.R. and the M.C.R. companies, and the Canadian Freight Association. It is ordered that order 6147, be amended by striking out "25 cents" in the 15th line of the operative part of said order, and substituting therefor "\$1."

THE MEXICAN ROUTE TO BRITISH COLUMBIA.

10005. Mar. 22.—The application of Elder Dempster & Co., under sec. 323 of the Railway Act, for order directing the C.P.R. and the G.T.R. to apply the established export basis covering general merchandise and commodities shipped from points in Eastern Canada to Montreal, Quebec, St. John, New Brunswick, Halifax, Nova Scotia for export to Vancouver, Victoria and other B.C. points, the said traffic to be forwarded from Montreal, St. John, and Halifax to Vancouver and other B.C. ports by the Elder Dempster Co.'s steamships to Puerto, Mexico, thence by the Tehuantepec National Ry. to Salina Cruz, Mexico, and thence by the Canadian Mexican Steamship Line to destination; it is ordered that the application be dismissed, without prejudice to the rights of any person interested to any relief the Board may deem proper upon a different set of facts being presented to it.

The Granting of Railway Charters.

A bill was introduced into the Senate, April 6, by Senator Davis, having for its object the transferring from Parliament to the Board of Railway Commissioners the power of granting charters for the construction of railways. He claimed that this would do away with the granting of charters to speculators who never intended constructing railways, but held them in order that they might be bought out. From 1900 to 1908, he stated, statistics showed that 65 companies, excluding the C.P.R., the G.T.R., the Canadian Northern Ry., and the National Transcontinental-G.T. Pacific Ry. had been chartered to construct 37,862 miles of railway, and of this mileage 463 had been constructed by 13 companies.

Trade and Supply Notes.

The matter which appears under this heading is compiled, in most cases, from information supplied by the manufacturers of, or dealers in, the articles referred to, and in publishing the same we accept no responsibility. At the same time we wish our readers to distinctly understand that we are not paid for the publication of any of this matter, and that we will not consider any proposition to insert reading matter in our columns for pay or its equivalent. Advertising contracts will not be taken with any condition that accepting them will oblige us to publish reading notices. In other words, our reading columns are not for sale, either to advertisers or others.

The Dougall Varnish Co., Ltd., Montreal, has increased its capital stock from \$150,000 to \$200,000.

The Holden Co., Ltd., general railway and contractors' supplies, has removed its head office in Montreal from 302 St. James St., to 354 St. James St.

C. P. Williams has been appointed to represent the Chicago Railway Equipment Co. at 30 Church St., New York, vice E. G. Buchanan resigned.

The Dominion Iron and Steel Co., Sydney, N.S., is supplying the 100-lb. steel rails for the relaying of the G.T.R. double track between Napanee and Toronto, 193 miles.

Wallace Robb, son of W. E. Robb, Superintendent of Motive Power G.T.R., has been appointed sales manager for the Anchor Packing Co., for the province of Quebec, with headquarters in Montreal.

The Northern Engineering Works, crane builders, Detroit, Mich., have been placing orders for new tools and machinery, consisting largely of lathes, gear cutters and milling machines, etc., for several months past, and the machinery is now being installed.

The Dominion Wire Rope Co., Ltd., at its annual meeting in Montreal recently, re-elected the directors, the organization for the current year being as follows:—President, F. W. Fairman; Vice President and Managing Director, F. H. Hopkins; other directors, E. E. Fairman, G. P. Butters and C. W. Colby; Secretary-Treasurer, J. J. Rosevear.

Burton W. Mudge & Co., railroad supplies, Chicago, will, on May 1, remove their offices to temporary quarters in suite 1003, Peoples Gas Building, until such time as the southern portion of the same building is completed, when they will occupy offices overlooking Michigan Boulevard and Adams St.

In the third annual report of the New York State Public Service Commission, the locomotive boiler inspector states that amongst the list of defects of locomotive boilers 184 drilled tell-tale holes in staybolts were found stopped up and became a source of danger instead of an element of safety. The Falls Hollow Staybolt Co. claims that this danger could not possibly exist with the use of staybolts as the air currents through the entire stay would unfaillingly prevent stoppage, and furthermore be a great advantage to combustion.

Recent Alberta Legislation

Among the acts passed at the first part of the current session of the Alberta Legislature, were the following:—

Alberta and Saskatchewan Ry.—Incorporation.

Canadian Pacific Ry.—Confirming agreement between the company and the City of Edmonton.

Diamond Coal Co.—Amending charter. Lacombe and Prazeau Ry.—Incorporation.

The Central Ontario Ry. Co. has been authorized by the Dominion Parliament to enter into agreements to amalgamate, etc., with various railway companies.

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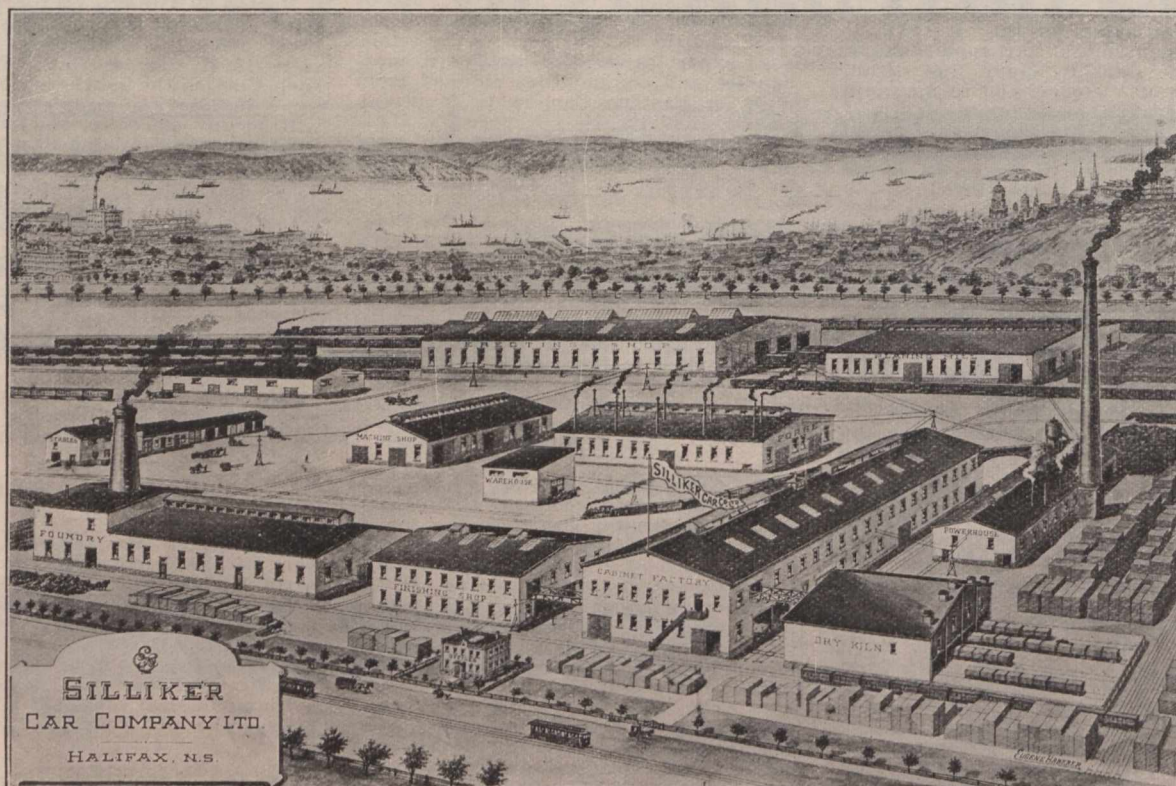
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C.P.R. Betterments, Construction, Etc.

Atlantic Division Improvements.—The betterments which it is proposed to carry out during the current year on the Atlantic Division, are said to include a new station at Woodstock, N.B., to cost about \$20,000; addition to the station at McAdam Jct., N.B.; extension of the yard accommodation at St. Stephen, N.B.; and relaying the section from Watt Jct. to St. Andrews, N.B., with heavier rails.

Tobique and Campbellton Ry.—The New Brunswick Legislature has granted an extension of time for the construction of this projected railway.

Windsor St. Station Viaduct.—We are advised that the contract for the building of the viaduct at Windsor St. station, Montreal, has been let to the Bishop Construction Co., of that city.

Montreal Terminal Improvements.—Work has been commenced upon the improvements to the company's Place Viger terminals. The improvements are to be on a very extensive scale, and will not be completed for some considerable time. The works include a viaduct to carry the street railway tracks between Dalhousie Square and Sohmer Park, and the rearrangement of the freight yard. The freight sheds will be directly under the viaduct, and the yards on either side of it. There is nothing being done at present in reference to the additional trackage which press reports recently state was to be built from Dalhousie Square to Hochelaga.

Ottawa.—The east wing of the roundhouse near the Wellington St. Viaduct, was burned April 12, the damage being estimated at \$12,000.

Cobourg, Lake Ontario and Western.—C.P.R. surveyors have been working for some time in the vicinity of Warkworth, Ont. The object of their work, local reports state, is the making of the final location surveys for the projected line through Cobourg.

Toronto.—D. McNicoll, Vice President, was in Toronto, April 15, and in an interview is reported to have said: "We have purchased some property a little back from the line of Yonge St., in North Toronto, and this will be utilized for improved freight accommodation in that district. A new passenger station is not just yet part of our programme, but we cannot say what the future will bring forth."

Tenders are under consideration for the erection of a new station at North Parkdale, Toronto. The plans provide for a structure having a frontage to the track of 100 ft. by 35 ft., with 24 ft. covered platform at either end. The waiting room will be 59 by 31 ft., adjoining which will be lavatories, baggage and express rooms, ticket office, etc. The structure will be of pressed brick.

Islington-Mimico Line.—It is said that the proposed branch from a point between the Humber River crossing and Islington, Ont., on the old Credit Valley Ry., to a junction with the G.T.R. near Mimico, about four miles will be built during the year. The object is to secure a direct connection with the C.P.R. tracks for its traffic coming over the G.T.R. from Hamilton.

Hamilton, Ont.—Reports state that three blocks of land north of the Toronto, Hamilton and Buffalo Ry., from McNab and Catharine Sts., have been purchased, and conveyed to a trust company for the purposes of the erection of a union station, etc., for the C.P.R. the T.H. and B., and the Canadian Northern Ry.

London, Ont.—Supt. McNeille, stated April 14, that while a number of sidings would be built during the current year at various points between London and Windsor, Ont., nothing had been definitely settled with reference to the pro-

posed improvements at the London yards and roundhouse.

Georgian Bay and Seaboard Ry.—A press report states that a contract is about to be let for the construction of a section of this line between the present easterly terminus at Coldwater Jct., and Orillia, Ont., the work to be completed by Nov. The Canadian Northern Ry., it is reported, will secure an entrance into Orillia from Atherly, over a portion of this line, and the station in Orillia will be a union one.

Fort William, Ont.—A press report states that the company will expend \$200,000 on doubling the capacity of its coal storage plant at Fort William, Ont., and that the work is to be completed by Oct.

An addition, 128 by 70 ft. is to be built at the machine shop, and a lot of new machinery has been ordered. Tenders have been received for the building of the addition.

Western Lines Contracts.—Tenders have been received for the following works and contracts will be let at an early date:—station buildings at Stone-wall and Yorkton, Man.; new freight car shops at Winnipeg; six stall additions to engine house at Ignace, Ont.; abutments for bridge 24.4 Souris section, Man.; construction of subway at McPhillips St. crossing, Winnipeg; ditching work along the line between Fort William, Ont. and Winnipeg; for excavating and back filling of trenches for 6 in. pipe lines between Chaplin and Forrest, Alta.; Macoun and Grassy Lake, Alta.; and Walsh, Alta.

Western Lines Construction.—In addition to the contracts reported let for construction on Western Lines mentioned in our April issue, we are officially advised of the following:—

The construction of a second track between Winnipeg and Portage la Prairie, Man., 50 miles, has been let to J. Hargrave & Co., Winnipeg.

The construction of a line from Tilston, Man., where the branch from Lander now terminates, for 24 miles westerly, has been let to P. Lamb, Winnipeg.

The extension from Outlook, on the Saskatchewan River for 93.5 miles, has been let to the J. D. McArthur Co., Winnipeg. It is the intention ultimately to connect up this branch with the Lacombe branch of the Calgary and Edmonton Ry., now having its easterly terminal at Castor, Alta. A description of the bridge which is to be built over the Saskatchewan River at Outlook, was given in our Mar. issue. Outlook is the present terminus of the branch from Moose Jaw.

The construction of 54 miles southeasterly from Macklin, on the Saskatoon-Wetaskiwin line, to a junction with the Moose Jaw-Lacombe line, has been let to Janse, McDonald & Timothy, of Vancouver. It is probable that next year an extension will be built east from Castor to connect with this year's construction between Outlook and Macklin, thus giving a through line between Moose Jaw and Lacombe.

Winnipeg Stock Yards.—Press reports state that the company will build larger stockyards at Winnipeg. The new yards, it was stated, April 14, by a city official, would occupy the whole of the balance of the company's property adjoining its present stockyards.

Winnipeg Beach Improvements.—The company proposes to lay a board walk along the beach nearer the water than the present one, and as soon as the Government breakwater is completed, to extend the pier and make it more attractive.

Bredenburg Terminals.—It is stated that a roundhouse and other terminal buildings will be built at Bredenburg, Sask., and that the work now done at Yorkton will be transferred there. Among the lines spoken of for future

construction is one from Bredenburg to Esterhazy, on the Kirkella line. The company has also power to construct a line northerly from Bredenburg to Kam-sack, Sask.

Regina-Prince Albert Line.—The Minister of Railways has approved of the plans for the location of a line from Regina to Prince Albert, Sask., about 129 miles, with the exception of 10 miles on each side of Howell.

Entrance to Edmonton, Alta.—The Alberta Legislature has confirmed an agreement between the company and the city council of Edmonton, with respect to the building of the company's line into the city.

Lethbridge Station Improvements.—A contract is reported to have been let to J. A. McDermid, Winnipeg, for building two wings, 40 ft. each at the Lethbridge, Alta., station, and rearranging the existing building.

Pacific Division Improvements.—A press report states that among the improvements to be carried out this season is the increasing of facilities at Field and Rogers Pass, and the carrying out of gradient reduction work between these two points.

Y.M.C.A. Building at Cranbrook.—The C.P.R. has decided to erect a suitable Y.M.C.A. building at Cranbrook, B.C. The building will be of frame, but otherwise it will compare very favorably with that recently opened at Kenora, Ont. It will be two stories high, with basement and attic, and will be 90 ft. by 36 ft. over all. In the basement, in addition to the heating and store room will be a billiard room and a bowling alley; on the ground floor, rotunda, diningroom, library, and lounging room, with kitchen, pantry, and Secretary's office; on the two upper floors there will be 26 bedrooms of different sizes, lavatories and bathrooms.

Phoenix Branch, B.C.—The new branch line to the Jackpot mine in the Wellington group is expected to be ready for operation early in May. There are two large trestle bridges on the spur, the first of which was completed April 9. The bridge is 168 ft. long, with a curvature of 15 degrees, and is 100 ft. high in the centre.

Kootenay Central Ry.—We are advised that the contract for the building of the proposed Kootenay Central Ry. from Fort Steele to Golden, B.C., has not yet been let. It appears to be possible that this work may not be gone on with this year.

Esquimalt and Nanaimo Ry.—A press report from Victoria, B.C., states that there is every probability of an arrangement being made for joint terminals at Alberni, for the use of the Canadian Northern and the Esquimalt and Nanaimo railways.

Tenders have been asked for the clearing of the right of way on the Comox extension between Union Bay and Oyster River, about 26 miles north of Comox.

Minneapolis, St. Paul and Sault Ste. Marie Ry.—A press report states that a block of land has been acquired on Lake Michigan, on the east side of Milwaukee, Wis., for terminal purposes.

The reconstruction of the old Wisconsin Central Rd. is being undertaken at a cost of about \$3,000,000, the object being to reduce the distance between Chicago and St. Paul. It is stated that a cut-off will be built from Muckwonago to Portage, and that traffic will go over that line to Stevens Point, instead of the Fond du Lac, as at present. It is also proposed to run trains from Chicago into Minneapolis first, instead of St. Paul, as at present, so as to bring the two divisions together. Work on the Chicago division improvements has been started near Owen and, it is stated, will be

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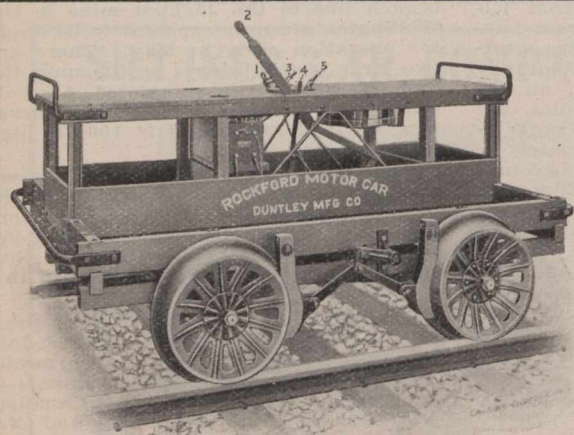
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pushed rapidly. A contract has been reported let to Lisk & Gifford Construction Co., Davenport, Ia., and work is now said to be in progress for grading a part of the cut-off of the Soo line between Withrow and New Richmond, Wis. This contract covers the portion of the road between Withrow and the St. Croix river, about eight miles. Construction is reported to have been resumed on the Thief River Falls Division towards Duluth, and contracts are reported let as follows:—Six miles of grading near Schley, Minn., C. E. Jamison; seventeen miles of grading, from Cass Lake narrows to the Mississippi River near Bemidji, Minn.; eight miles of grading from Mississippi River to west of Wilton, Minn., J. Moberg.

The courts have authorized the company to cross the Northern Pacific Ry. tracks at grade level for two years pending the erection of an overhead approach to the new station at Sixth Ave., W., Duluth, Minn. (April, pg. 293.)

A Railway to Hudson Bay.

The Minister of Railways said in the House of Commons, April 16, that the Government, after a most careful investigation of the whole plan had fully decided to proceed with the construction of a railway to Hudson Bay. The project had its difficulties, but these could be met. He did not entertain any fears as to the success of the undertaking. The engineers who had been making the surveys reported that there were no insurmountable obstacles in the way of construction. Survey parties had been in the field nearly two years and had reported very fully as to the physical condition of the country through which the road would run. Meteorological records as to conditions in Hudson's Bay and Straits were available covering the last 50 years. Careful surveys had been made of the harbor at Port Nelson and Port Churchill. This summer the Government would send up a vessel to the Straits and Bay to make further investigation of navigation conditions throughout the summer and fall, as long as the Straits remain open.

The supplementary estimates submitted in the House of Commons Apr. 20, provide \$500,000 to begin the construction of this line.

Recent Dominion Legislation.

The Dominion Parliament at its current session has passed the following acts affecting transportation interests:—

Algoma Central and Hudson Bay Ry.—Extending time for construction.

Bay of Quinte Ry.—Authorizing construction of branch line, and extending time for construction.

Calgary and Fernie Ry.—Amending act of incorporation.

Dominion Atlantic Ry.—Authorizing construction of branch line.

Erie, London and Tillsonburg Ry.—Extending time for construction.

Grand Trunk Ry.—Authorizing acquiring securities of certain other companies.

Montreal and Southern Counties Ry.—Extending time for construction.

Northern Empire Ry.—Extending time for construction.

Ottawa, Brockville and St. Lawrence Ry.—Extending time for construction.

Ottawa, Montreal and Eastern Ry.—Incorporation.

Pine Pass Ry.—Incorporation.

Richelieu and Ontario Navigation Co.—Amending the company's acts.

Saskatchewan Central Ry.—Incorporation.

G. H. Kelly, son of M. Kelly, railway and general contractor, Winnipeg, was married there, April 12, to Miss F. M. A. Barreau.

G.T.R. Betterments, Construction, Etc.

Southern New England Rd.—The law giving this company power to construct a direct line through Rhode Island to Providence, was signed by the Governor of the State, April 13. The company is a subsidiary of the Central Vermont Ry., which is owned by the G.T.R.

E. H. Fitzhugh, First Vice President G.T.R., stated in Boston, Mass., April 14, that no time would be lost in making surveys for the new line. The company would apply to the Commissioners of Railroads for Massachusetts for a certificate of exigency for the portion of the projected line in that State, and construction work would be proceeded with in the two States simultaneously.

Quebec Terminals.—The G.T.R. which now has a terminal in Levis, Que., on the south side of the river, is desirous of obtaining terminal facilities in Quebec City. Several of the company's officials met the Quebec Harbor Commissioners, April 9, and discussed the matter. The company desires to secure the Atkinson wharf, G.T. wharf, East India wharf and Wellington wharf. The proposal is under consideration.

Lachine, Jacques Cartier and Maisonneuve Ry.—The plans of the company for the closing of certain streets in Montreal, the crossing of other streets, the building of tunnels, bridges, etc., were laid before the Quebec Legislature, April 7, in connection with the application for the ratification of the agreement with the city council.

Coteau Bridge.—The superstructure of the bridge across the St. Lawrence near Coteau, Que., is being renewed. The original superstructure was built in 1889 by the Dominion Bridge Co. for the Canada Atlantic Ry. (now part of the G.T.R.) and was designed for a uniform load of 3,000 lbs. per linear foot with provision for engine excess loads. The renewal is being made in order to meet conditions imposed by the heavier motive power and train loads in use on the G.T.R. main line of this system, which it is contemplated to use also on this section of the line. The new superstructure has been designed for Cooper's E-50 class of loadings, specification of the American Railway Engineering and Maintenance of Way Association. The length of the new spans is similar to the old ones, as the new superstructure is being built on the old piers. The old swing or channel span of this bridge was heretofore operated by hand power, but the new one will be swung by steam power. The work is at present on this swing or channel span, and it will be completed in time for the opening of navigation down the river at this particular place. During the summer the remaining spans will be replaced. The swing bridge over the Soulanges canal in this locality is also being renewed for similar reasons to those mentioned in connection with the St. Lawrence bridge.

Kingston, Smiths Falls and Ottawa Ry.

—The Dominion Parliament has granted an extension of time for the construction of this projected line. In an interview at Ottawa, April 9, W. Wainwright, Fourth Vice President G.T.R., said: "We have acquired the charter, and it is with the intention of building the line. Just when it will be done I am not in a position to state. Its construction is only a season's work, and when it is started it will be rushed to completion."

Port Hope Viaduct.—The superstructure of the viaduct carrying the line across the town of Port Hope, Ont., is being renewed. All masonry work in connection with the changes in the piers necessary in order to meet the new conditions has been finished. The new girders of the north main line are all in place and 14 of the total of 22 spans of the south track have the new girders in

place also. Work is in progress on the erection of the remainder. This new superstructure is replacing that which was erected in 1892 and which was designed for a uniform load of 4,000 lbs per linear foot. The present bridge has been designed for Cooper's E-50 class of loadings, and the renewal has been made in order to meet the conditions required by the heavier motive power and train loads which this railway is using.

Toronto Union Station.—E. H. Fitzhugh, First Vice President G.T.R., stated April 2, that his company was ready to do its share in building a union station for Toronto. It had not been informed of any intention of the C.P.R. to leave the waterfront.

Block System.—E. H. Fitzhugh stated in an interview, April 2, that the company had under consideration plans for the installation of electric signals on the line between Toronto and Suspension Bridge. The signals would be installed at mile or half mile posts, and it was expected that more trains could be run over the line than is the case at present. The time tables show at present 100 freight and passenger trains a day over the line.

London Improvements.—C. M. Hays, President, together with a number of other officials, was in London, April 21, when the matter of the proposed improvements of the company's lines in the city was discussed.

Stratford Station, Etc.—The Mayor met E. H. Fitzhugh, First Vice President, and other G.T.R. officials, April 1, to discuss the plans for improvements there. The company asks that the city agree to the closing of a street, and build a subway at another street (estimated to cost \$50,000), the company to build a modern two story station and office building, some additional building at the locomotive shops, and rearrange the tracks and yards, the estimated cost of the works being about \$250,000. The matter is under consideration by the council. (April, pg. 289.)

Delaware and Hudson Co.

The annual report for the year 1909, states that the policy of the former management in expanding the company's railways by the purchase of the Quebec, Montreal and Southern Ry., and the policy of the present management in financing the same has been apparently justified. Previous to 1906, the D. and N.R. had extended no further than the International boundary. At that time the company bought the entire capital stock of the Q., M. and S. Ry. in Canada, and certain electric railways and coal properties in the U. S. The purchase of the Q., M. and S. Ry., which has now been extended as far as Fortierville, and was put in operation June 14, 1909, was largely a protective measure. The company's heavy coal haul is, of course, north, and it has needed traffic south to balance the loaded car mileage bound north. By the purchase of the Q., M. and S. Ry. the management was able to protect the wood pulp industries located on its line and secure accordingly a considerable tonnage of lumber southbound. After reviewing the freight statistics the report states the securing of a grain tonnage amounting to 450,369 tons in 1909, as compared with 316,012 tons in 1908, is an indication that the company is able to justify its extension into the territory of the Canadian roads. Both the movement of the grain tonnage and lumber tonnage, which latter showed a considerable increase in 1909, is in the right direction, that is south. Although the revenue from freight traffic was 82% of the total revenue, passenger traffic is important, because of the future possibilities of developing a considerable through traffic between New York and Quebec. The Q., M. and S. Ry. is to be

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The following table shows the earnings and expenses in 1909 and 1908:—

	1909.	1908.
Mileage operated	843	845
Coal freight revenue.....	\$8,311,479	\$9,106,820
Merchandise freight rev'e	7,691,617	6,162,181
Passenger revenue	2,834,628	2,693,672
Total operating revenue.....	19,525,859	18,500,731
Maintenance of way	1,334,546	1,417,319
Maintenance of equipmt	2,598,566	2,219,543
Traffic	227,347	204,849
Transportation	6,821,392	6,528,112
Total operating expenses.....	11,458,480	10,811,721
Railway taxes	411,468	413,029
Operating income	7,655,912	7,275,982
Net earnings coal dept'm't	507,875	1,145,418
Gross corporate income.....	9,980,531	9,926,075
Net corporate income	5,194,840	5,254,458
Dividends	3,825,090	3,816,000
Surplus	1,369,750	1,338,458

Railway Finance, Meetings, Etc.

Alberta Ry. and Irrigation Co.—Approximate net profits from all sources, exclusive of land sales for Feb., \$45,211, against \$43,310 for Feb., 1909. Cumulative net profits for eight months ended Feb. 28, \$342,896. Traffic receipts for Mar., \$34,518 against \$27,627 for Mar., 1909. Aggregate traffic earnings for nine months ended Mar. 31, \$285,797.

Canadian Northern Ry.—A trust deed has been filed with the Secretary of State at Ottawa, made by the C.N.R. Co. to the British Empire Trust Co., the National Trust Co., and the Province of Saskatchewan, securing an issue of 30 year 4% bonds, guaranteed by the Province of Saskatchewan. The deed is supplementary to one made May 18, 1909.

A press report from Vancouver, B.C., April 6, states that Jas. Dunsmuir has acquired \$4,000,000 of C.N.R. bonds.

Canadian Northern Ontario Ry.—The Dominion Parliament has authorized the company to enter into agreements for amalgamation or other purposes with the Central Ontario Ry., Bay of Quinte Ry., Irondale, Bancroft and Ottawa Ry., and some small mining railway in Central Ontario, as well as with several other railway companies, in other parts of Ontario which as yet have not done any construction. It is also provided "for the removal of doubt," that the company has had the power to and may consolidate the various issues of securities theretofore made, and to retire the originally issued stocks.

Dominion Atlantic Ry. Gross earnings for Mar., \$85,600, against \$75,725 for Mar., 1909. Gross earnings for nine months ended Mar. 31, \$304,750, against \$864,204 for same period 1908-09.

Esquimalt and Nanaimo Ry.—In 1904 the British Columbia Legislature passed an act entitled the Vancouver Island Settlers' Rights Act, with a view of settling the position of squatters and others on the lands granted in aid of the construction of the E. and N.R. The company claimed that it was entitled to compensation, and after lengthened negotiations an agreement was entered into between the company and the Province, Oct. 21, 1909. The company is given the right to select 20,000 acres of unoccupied and unreserved crown lands on the Island, in rectangular blocks of not less than 640 acres. The lands are to be selected within three years, and are to be exempted from taxation for 10 years from the date of the issue of the crown grant. This agreement was confirmed at the last session of the Legislature.

Georgian Bay and Seaboard Ry.—The lease which the C.P.R. has of this line will run for 999 years from Jan. 1, and not for 99 years, as dated in our last issue.

Grand Trunk Pacific Branch Lines.—An issue of £1,270,500 of 4% bonds was placed on the London, Eng., market, April 6, at £98.10s. The issue is being made for the purpose of providing funds for the construction of branch lines.

North Shore Ry.—A receiver was appointed by the New York Courts, Mar. 28, for the Canadian Consolidated Mines. The company was incorporated, Mar., 1909, under the Laws of the State of Maine, with a capital of \$5,000,000, as a holding company for a number of coal mining companies in New Brunswick and Nova Scotia. Of the stock there has been issued \$4,890,000 of which Luella N. Von Hagen, owns \$1,000,000. The indebtedness of the company is placed at \$50,000, of which \$19,500 is due on notes held by Luella N. Von Hagen, the petitioning creditor. D. P. Hays and D. Davis have been appointed receivers under bonds amounting to \$75,000. The president of the company is H. Von Hagen.

Stock in the following companies is held by the company:—North Shore Ry. (formerly Beersville Ry., and Beersville Coal and Ry. Co.), Northern Coal Co., Kent Coal Co., Maritime Coal Co., in New Brunswick; Crown Coal Co., Great Northern Coal Co., in Nova Scotia, and one company in Maine.

Sydney and Louisburg Ry.—The Nova Scotia Legislature has incorporated a company with this title to construct, purchase or lease any railway in Cape Breton Island, N.S. The capital of the company is fixed at \$1,000,000, and power is given to increase it to \$5,000,000. The principal object of the company is to take over the existing railway between Sydney and Louisburg, with its branch lines to the Dominion Coal Co.'s mines, and its connections with the Dominion Iron and Steel Co.'s plant. The existing lines have a length of about 40 miles and are owned by the Dominion Coal Co. The provisional directors are J. H. Plummer, M. J. Butler, C. S. Cameron, D. H. McDougall, and R. F. McCourt, all of whom are connected with the Dominion Coal Co. or the Dominion Iron and Steel Co.

In the D.C. Co.'s annual report it is stated that the reason for obtaining this charter was that the directors were of the opinion that the railway could be more satisfactorily carried on by an independent company operating under the Provincial railway laws than by being directly operated by the company.

Quebec and Lake St. John Ry.—Total traffic earnings for Mar., \$49,598.53, against \$53,135.78 for Mar., 1909. Aggregate traffic earnings for three months ended Mar. 31, \$119,592.54, against \$136,456.02 for same period 1909. Mileage operated 280, against 285.4 in 1909. Earnings per mile for Mar., \$177.24, against \$186.18 for Mar., 1909, and for three months ended Mar. 31, \$427.21, against \$478.12 during the same period 1909.

Quebec and Lake St. John Ry.—Notice is given by the Q. and L. St. J.R. Bondholders' Protection Committee that a full majority of first mortgage and income bonds have been deposited to its order. The time for depositing bonds was extended to April 18, after which date bonds would be received on terms to be fixed by the committee.

Quebec Central Ry.—Gross earnings for Feb., \$62,741.76; expenses \$52,960.79; net earnings \$9,780.97, against \$60,892.11 gross earnings; \$54,709.95 expenses; \$6,182.16 net earnings for Feb., 1909. Aggregate gross earnings for eight months ended Feb. 28, \$704,536.94; expenses \$494,608.07; net earnings \$209,928.87, against \$667,669.66 aggregate gross earnings; \$482,943.87 expenses; \$184,725.79 net earnings for same period 1908-09.

Temiscouata Ry.—Profit on operation for Feb., \$1,351, and for two months ended Feb. 28, \$2,901.

National Transcontinental Railway.

A statement of the distances, mileages and the amount of work done on the 21 contracts covering the 1804.84 miles from Moncton, N.B., to Winnipeg, Man., recently laid before the House of Commons, showed the total percentage of work done on the various contracts was 57.2%, made up as follows:—1,062.1 miles of grading completed; 728.1 miles of track laid; 439.8 miles of ballasting done; and 368 miles of telegraph lines completed, in addition to the bridge construction work.

The plans for the reconstruction of the bridge over the St. Lawrence River at Quebec have been on exhibition since Jan., and the specifications for the work are almost completed. It is expected that tenders for the superstructure will be invited in about a month.

In the evidence given by A. E. Doucet, District Engineer, April 18, before a House of Commons committee it was stated that after the grading of the 150 miles west-erly from Quebec had practically been completed, the G.T.P.R. engineers insisted that the route must be changed, because the one under construction did not give the required gradient of 0.4%. The original cost of the 150 mile section was estimated at \$5,297,857, and the actual cost to date, after reconstruction, was \$11,219,828. Tenders were received to April 20, for the purchase of the five buildings at Matheson, Ont., owned by the Commission, and tenders will be received by May 2, for the erection complete of a station building at Lake Superior Jct., Ont.

A Montreal dispatch April 13, says the G.T.P.R. officials have a semi-official assurance that the section of the line between Cochrane, the junction with the Temiskaming and Northern Ontario Ry., and Lake Superior Jct., will be completed much earlier than was anticipated. As soon as this is done it will be possible for the G.T.R. to run trains through from Montreal and other points on its line to Winnipeg, Edmonton, etc., via Toronto, North Bay and the T. and N.O.R. to Cochrane.

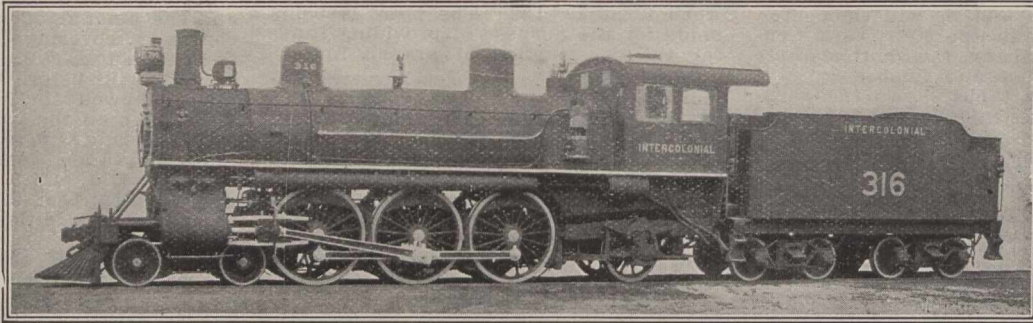
As a result of the recent decision of the Board of Railway Commissioners, there has been a change in the route of the line through St. Boniface, Man. The new route will leave the Springfield road near Mission Road and will proceed along lot 74 to within a mile of the city hall, where it will cross the C.P.R. Emerson line, and continue south-easterly to the Lombard St. bridge. This change will do away with dangerous crossings of other lines.

Rapid progress is being made with the construction of the shops near Winnipeg. The whole work is expected to be completed by the end of the year. We are advised that the date for the completion of the contracts for the equipment of the locomotive shops at Winnipeg, has been extended to Oct. 1.

Grand Trunk Pacific Ry.—In an interview in London, Eng., recently, C. M. Hays, President G.T.R., said: "We are well satisfied with the progress being made with the G.T.P.R. Before the next harvest is ready to be handled we shall be ready to carry heavy traffic right through from west of Edmonton to the steamships on the great lakes at Fort William, and it is safe to say that a regular service of passengers and freight trains will be running on the G.T.P. tracks to Prince Rupert in 1913."

Mail advices from Prince Rupert, received in Montreal, April 12, state that the work of laying out the new city is being rapidly proceeded with. Several wharves are being built, and the company is planning extensions to its wharf system. A contract for laying out the terminal yards has been let to D. J. Dempsey, who has also the contract for

(Continued on page 379.)



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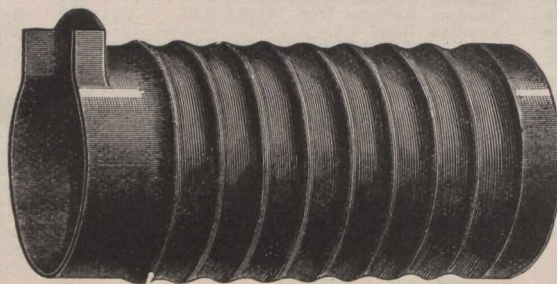
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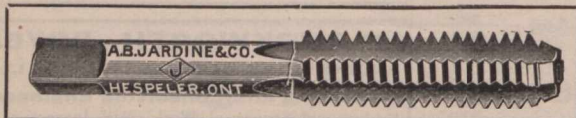
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Hespeler, Ont.

(Continued from page 375.)

the tracklaying on the first 100 miles easterly..

Grand Trunk Pacific Branch Lines.—The two branch lines upon which the company is concentrating its energies are the one from Melville via Regina to the International boundary near Portal, Sask., and the other from Wainwright via Calgary to the International boundary near Coutts, Alta. On the first of these tracks was laid in 1909 from Melville to Balcarres, and grading is in progress on the 60 miles between Balcarres and Regina. A press report states that a contract has been let to the J. D. McArthur Co., who are grading this 60 miles, to do the grading on the line from Regina to Portal. The Government has notified the company that this section of the line must pass through Weyburn, or the guarantee will not be affixed to the bonds. The line which the company proposes to construct to Hudson Bay also starts from Melville. The section to Yorkton, 25 miles, was completed in 1909, and a contract has been let for the grading of a further section to Canora, 30 miles. It is reported that contracts have been let to the J. D. McArthur Co. for a 50 mile line from Watrous to Prince Albert, Sask.; a 50 mile line from Biggar to Battleford. Work has been started by the J. D. McArthur Co., on the Lofield-Calgary line, upon which track was laid to Cameron, 26 miles, in 1909. The surveys for the line into Calgary have been completed, and plans showing the route into the city were filed April 1. The line passes through the Pitman estate about three miles east of Calgary, on the Blackfoot trail, and turning south meets the C.P.R. about a mile east of the railway bridge on the Bow River. The route keeps close to the C.P.R. until the city boundary is reached, whence it passes through the alliance and sub-division and through east Calgary on Eighth St. (April, pg. 289.)

Geodetic Survey of Canada.

A return has been issued by order of the House of Commons giving copies of all correspondence, reports, documents and orders-in-council relating to the establishment of a Geodetic Service Bureau and the commencement of a Geodetic Survey in Canada. The documents include memorials from engineering and other bodies, reports from the Chief Astronomer, the Committee of Surveys, etc., dating from 1886. A Committee on Surveys was constituted under an Order-in-Council in 1906, and a report was prepared in 1907, but was not submitted to the Governor-in-Council until Feb., 1909. The report states that a comprehensive and reliable survey of the Dominion for the production of an accurate topographical map, based upon a network of triangulation and showing the natural and artificial features of the country, is of urgent necessity from the standpoint of economy, the extension of public undertakings and the development of the natural resources of the country. It was recommended by the committee that the survey should be made with the co-operation of the survey departments of the different provinces, that all the survey work should be under one central controlling authority, that all maps of surveys should be deposited in a central record office, which should have charge of the printing of all maps required. The committee pointed out that at present about \$900,000 a year was expended by the different departments upon survey work, and it was calculated that by a unification as suggested at least \$60,000 a year could be obtained, without any increased votes, for a triangulation survey. A map is issued showing that certain triangulation survey work has been done in Ontario and Quebec, practically along the St. Lawrence River, and Lakes Ontario and Erie, from Quebec City to Windsor and Sarnia.

Nova Scotia Railways.

The Provincial Engineer for Nova Scotia, R. McColl, in reporting on the work of his department for the year ended Sept. 30, 1909, says there was very little railway work done. This apathy in the work of railway construction is not to be wondered at, as during the previous 10 years the railway mileage in the province increased rapidly. In 1908 there were 166 miles of subsidized railways coming under the jurisdiction of the Department; now there are 475 miles. The returns show a considerable decrease during the year, there being a falling off in traffic returns of about 8%. The principal decline was on the Sydney and Louisburg Ry., where there was a decrease of 16%; the Inverness and Richmond Ry. and Coal Co., a decrease of 11%; the Halifax and South Western Ry., a decrease of 4%. The Maritime Coal, Ry., and Power Co., showed an increase of 25%, and the Cumberland Coal and Ry. Co., an increase of 8%. The decrease is almost entirely attributed to the labor troubles in connection with the coal trade, so far as the Sydney and Louisburg Ry., and the Inverness and Richmond Ry. and Coal Co., are concerned; and the dullness of the lumber trade affecting the Halifax and South Western Ry.

There are 634 miles of railway owned by 11 companies under Provincial jurisdiction; the Intercolonial Ry., 467 miles and the Dominion Atlantic Ry., 221 miles, coming under Dominion jurisdiction. The total mileage of railways in the province is practically the same as in 1908, and with the exception of the construction of a branch of four miles from near Nictaux station on the Halifax and South Western Ry. to the Torbrook Iron mines, there is no new work in hand. There is one mile of railway in operation for every 343 of the population, against one mile for every 300 in the Dominion. Taking the average of the Nova Scotian railways the rate per mile for passengers appears to be slightly greater than on large railway systems, it is apparently considerably less than the average rates in Canada on the shorter lines. Over 4,000,000 tons of freight were carried at a cost of about \$800,000 to the shipper. At least half of this freight could not have been moved by water. The returns show good profits on practically all the coal carrying lines, which are owned by the colliery companies. The construction of a railway for lumbering purposes by the Sable River Lumbering Co., connecting with the Halifax and South Western Ry., the reconstruction of the Liverpool and Milton Tramway and its connection with the H. and S.W. Ry., and the continued extension of the Davison Lumber Co.'s railway add greatly to the freight of the H. and S.W. Ry., these three lines being great feeders to this system, and providing a very large amount of freight. The Sable River Ry. turns over nearly 10%; the Liverpool and Milton Ry. nearly 15%, and the Davison Lumber Co. nearly 40% of the entire freight of the whole H. and S.W. Ry. It is expected that when the branch from Nictaux Falls to Torbrook has been completed it will provide an additional amount of freight much greater than the total amount now carried over the existing line. The 60 mile Inverness and Richmond Ry. hauls nearly double the tonnage, and its receipts for freight are nearly equal to those for the H. and S.W. Ry. The management of the different railways are to be commended for their efforts to have their employes guard against forest fires, and have welcomed the inspection of their locomotives by the Government.

The returns of accidents during the year show 18 casualties against 17. One passenger was killed by falling off a train; seven passengers were injured by

a derailment; one employe was killed and four injured, and of those who were neither passengers or employes three were killed and two injured. There were no passengers killed or injured in the year 1907-08.

Michigan Central Ry. Report.

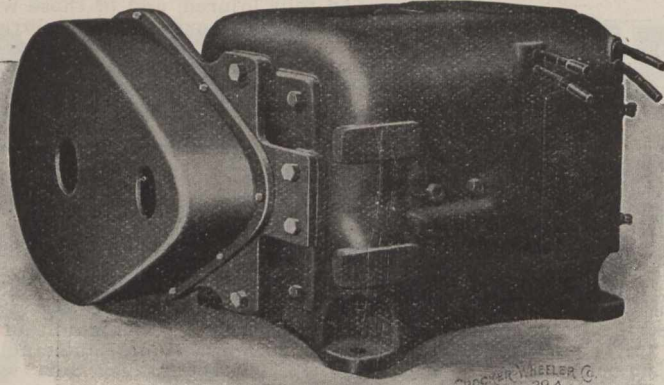
The directors report for the year 1909, covers the operation of the following mileage:—Main line 270.07 miles; proprietary lines, 345.05 miles; leased lines, 1,117.34 miles; lines operated under trackage rights, 14.00 miles; a total of 1,746.46 miles. The amount of capital stock authorized and outstanding was \$18,738,000; the funded debt was \$42,159,000.

The total operating income was \$27,415,467.20, of which \$18,267,530.44 was from freight, \$6,655,698.85 from passengers, \$1,244,745.14 from express, \$409,212.23 from mails and from miscellaneous sources \$840,280.54. The total operating expenses were \$18,499,528.24, leaving a net income from operation of \$7,743,254.98, an increase of \$1,429,610.70 over 1908. Other sources of income brought in \$941,480.65. The deductions from income, including the payment of a dividend of 6% on the capital stock, left a balance of \$11,748,216.80 to be carried to profit and loss account. The statistical tables do not give details of the operations of the company's lines in Canada, but the following items of information are mentioned:—Accrued taxes in Canada, on value of real and personal property, \$38,742.78; interest on 6% Canada Southern 1st mortgage bonds, \$840,000; interest on 6% Canada Southern 2nd mortgage bonds, \$300,000; interest on 4% Leamington and St. Clair mortgage bonds, \$5,200; rental of Canada Southern Ry., \$375,000. The company expended on capital account \$1,942,436.93 on improvements to property of which \$251,980.65 was for yards and sidings; \$22,479.79 for stations and other structures, and \$486,545.19 for roadway on the Canada Southern Ry., the remainder being expended on the U.S. lines. The stocks and bonds owned or acquired under lease include 78,100 shares of the Canada Southern Ry., value \$7,810,000; 3,000 shares of the Detroit River Tunnel Co., value \$3,000,000; 4,464 shares in the Toronto, Hamilton and Buffalo Ry., value \$446,400; and bonds to the value of \$357,000 of the latter company. The total face value of stocks and bonds owned or acquired is \$22,114,529.17, valued in the books at \$9,375,998.38.

The Fredericton Construction Co. has been incorporated under the New Brunswick Companies' Act, with a capital of \$50,000 and offices at Fredericton, to carry on a general contracting and engineering business, to survey, lay out, construct and equip electric and steam railways; to construct wharves, terminal facilities, etc. The provisional directors are:—A. R. Slipp, R. B. Hanson, H. P. Robinson, J. Walker, H. W. Walker, Fredericton, N.B.

The Practical Engineer Pocket Book and diary for 1910, is the title of a very handy volume issued at one shilling in cloth, and 1s 6d in leather, by the Technical Publishing Co., 55 and 56 Chancery Lane, London, W.C., England. There are 684 pages of solid, practical information for those interested in the construction and operation of steam engines of all classes, together with a copious index.

Temiskaming and Northern Ontario Ry.—Traffic receipts for Feb., \$120,829.75; expenditure \$83,387.29; net earnings \$37,442.46; ore royalties \$4,953.49; total \$42,395.95; less hire of equipment \$2,595.94; net result \$39,800.01.



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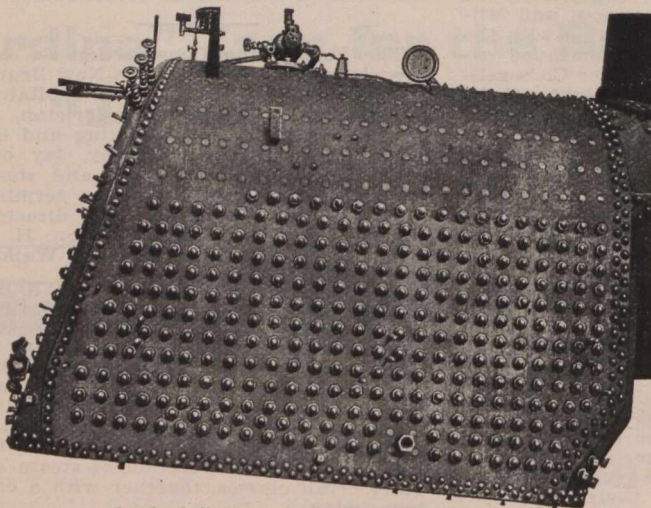
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AGENTS FOR THE

Flannery Bolt Company, - Pittsburgh, Penn., U.S.A.

MAINLY ABOUT PEOPLE.

Mrs. Osler, wife of E. B. Osler, M.P., director C.P.R., died in Toronto, April 5.

E. B. Osler, M.P., director C.P.R., has been elected Hon. President of the British Welcome League, Toronto.

Sir H. Montagu Allan, returned to Montreal, Apr. 10, after having spent some time in England.

Sir Wm. C. Van Horne, Chairman of the Board, C.P.R., has been elected a director of the Dominion Coal Co.

Sir Thomas G. Shaughnessy has been elected a Vice President of the Royal Colonial Institute, London, Eng.

W. Sutherland Taylor, ex-Treasurer C.P.R., and Mrs. Taylor, have left Montreal to spend the summer in Europe.

Jean Creighton, younger daughter of T. C. Matchett, C.P.R. ticket agent, Lindsay, Ont., died there, Apr. 20, aged 6.

J. Simson, who has been in the G.T.R. Freight Department for a number of years, died at Toronto recently, aged 76.

W. I. Gear, and the Misses Gear, Montreal, arrived in Montreal, Apr. 22, from Great Britain, where they spent a few weeks.

J. P. Mabee, Chief Railway Commissioner for Canada, has sold his house in Rosedale, Toronto, and removed to Ottawa.

W. R. McRae, Master Mechanic, Toronto Ry., has been reappointed Rector's Warden of Christ Church, Deer Park, Ont.

W. Whyte, Second Vice President C.P.R., returned to Winnipeg Apr. 13, from a six weeks' trip in the Southern States.

The Hamilton Steamboat Co.'s staff presented a travelling bag recently to Miss Abraham, on her retirement from the Secretaryship.

D. B. Hanna, Third Vice President Canadian Northern Ry. has obtained a city permit to erect a \$28,000 house on Castle Frank Ave., Rosedale, Toronto.

J. L. Engelhart, Chairman Temiskaming and Northern Ontario Ry. Commission spent some ten days in New York at the end of April.

Gordon Jennings, C.E., of Chicoutimi, Que., son of the late W. T. Jennings, C.E., Toronto, was married in Toronto April 1, to Miss Muriel Millichamp.

R. J. Mackenzie, of Mackenzie, Mann & Co., Ltd., Winnipeg, and son of the President Canadian Northern Ry., was married at San Jose, Cal., recently.

E. A. Forster, solicitor for the Toronto Railway Employes Union and Benefit Society, died at Toronto, Apr. 9, after a lengthened illness.

Victor Anderson, son of Lt.-Col. Anderson, Chief Engineer, Marine Department, Ottawa, is to be married to Miss Bessie Gordon, of Montreal, early in June.

Miss E. M. V. Harris, daughter of A. H. Harris, Special Traffic Representative C.P.R., was married in Montreal, April 12, to the Rev. J. K. Tibbits, of Concord, N.H.

J. Dunsmuir, director C.P.R., and formerly Lieut-Governor of British Columbia, is reported to have purchased \$4,000,000 of Canadian Northern Ry. bonds.

W. Mackenzie, President Canadian Northern Ry., was entertained at dinner at the House of Commons, London, Eng., Apr. 13, by a number of members and friends.

Miss D. M. Fletcher, granddaughter of Collingwood Schreiber, C.M.G., Consulting Engineer, Department of Railways and Canals, was married to R. S. Lake, M.P., at Ottawa, Apr. 4.

Fred Shaughnessy, son of the President C.P.R., who is engaged in the Fourth Vice President's office, at Montreal, is spending a short holiday in England for his health.

Jno. Niblock, formerly Superintendent District 3, Western Division, C.P.R., Calgary, has removed to his fruit farm at Naramata, B.C., where he will in future reside.

The Souris, Man., Board of Trade, entertained General Superintendent Arundel, and the Divisional Superintendents at Winnipeg, Brandon and Souris, at a dinner, April 11.

The engagement is announced of Miss Grace Lowrey, step-daughter of Hayter reed, Manager in Chief C.P.R. Hotels, to Harold Daly, son of Hon. T. Mayne Daly, K.C., Winnipeg.

C. B. Foster, Assistant General Passenger Agent C.P.R., Vancouver, B.C., has returned to business after having visited his home in New Brunswick, and friends at other eastern points.

Hugh Sutherland, Executive Agent Canadian Northern Ry., Winnipeg, who left for Europe at the end of March, to meet Mrs. Sutherland, is expected to return with her during May.

Jno. Simpson, who died in Toronto recently, aged 76, was for 45 years in the G.T.R. service. At the time of his retirement, about seven years ago, he was station agent at Cayuga, Ont.

Mrs. M. B. Beasley, mother of H. E. Beasley, Superintendent Esquimalt and Nanaimo Ry., Victoria, B.C., and of H. H. Beasley, General Storekeeper, Toronto Ry., died at Toronto recently.

G. H. Anthony, General Agent Pere Marquette-Lehigh Valley Line, St. Paul, Minn., and formerly General Agent Wisconsin Ry., Winnipeg, was visiting in Winnipeg during the latter part of April.

T. S. Scott, who recently resigned the position of chief assistant city engineer, Toronto, was formerly engineer in charge of construction of the McRae, Chandler and McNeill contract on the Temiskaming and Northern Ontario Ry.

D. B. Hanna, Third Vice President Canadian Northern Ry., returned to Toronto, Apr. 9, from Great Britain, where he spent some two months in organizing the Canadian Northern Steamships service.

R. R. Jamieson, mayor of Calgary, Alta., and formerly General Superintendent C.P.R. Central Division, is reported to have been asked to take the portfolio of Minister of Public Works for Alberta.

H. N. Ruttan, President Canadian Society of Civil Engineers, was recently presented with an oil portrait of himself, by the Winnipeg city engineering staff to mark his twenty-fifth anniversary as city engineer.

C. M. Hays, President G.T.R., and G.T.P.R., accompanied by Mrs. and Miss Hays, returned to Canada, Apr. 14, from England, where they had taken part in the launching of the G.T.P.R. s.s. Prince George.

Sir Thomas G. Shaughnessy, President C.P.R., has given an emphatic denial to the recent rumor emanating from the U.S., to the effect that he would shortly resign the Presidency of the C.P.R. to enter politics.

W. F. Salisbury, local Treasurer of the C.P.R. at Vancouver, B.C., is one of the provisional directors of the Western Union Fire Insurance Co., which has been incorporated by the British Columbia Legislature.

O. O. Winter, formerly General Superintendent Grand Trunk Pacific Ry., Winnipeg, is reported to have purchased about 10,000 acres in the Moose Lake district, Sask., and it is stated that he is about to take up residence there.

Major J. E. Hutcheson, Superintendent and Purchasing Agent Ottawa Electric Ry., will command the Canadian rifle team at Bisley this year. He will sail from Montreal on the s.s. Tunisian, June 17.

W. Mackenzie, President Canadian Northern Ry., who left Toronto for England, Mar. 9, accompanied by Mrs. Mackenzie will, probably return during May, by the Canadian Northern Steamships line.

H. W. McLeod, who has been appointed Trainmaster District 3, Pacific Division C.P.R., at Nelson, B.C., is a graduate in civil engineering of the University of New Brunswick, and prior to this appointment was Resident Engineer C.P.R., Calgary, Alta.

F. Leeper, cashier Pere Marquette Rd., at St. Thomas, Ont., died at Dresden, Ont., recently. He had been with the company since it took over the Lake Erie and Detroit River Ry., and had been on leave of absence since Jan. on account of ill health.

Miss F. Johnson, secretary to H. R. Charlton, General Advertising Agent G.T.R. and G.T.P.R., Montreal, was presented with a travelling bag recently, by her associates, on the occasion of her leaving the service to be married to S. Simpson, Winnipeg.

J. W. Kearns, District Passenger Agent Pere Marquette Rd., Detroit, Mich., and formerly Travelling Passenger Agent same road, London, Ont., was presented recently with a purse of gold by a number of friends at London, on his appointment to the former position.

W. A. Bowden, who has been engaged in the engineering branch of the Department of Railways and Canals for about five years, and who has been acting as Chief Engineer since the resignation of M. J. Butler, is reported as likely to be appointed to that position in the near future.

W. A. Cooper, General Superintendent of Sleeping, Dining and Parlor Cars and News Service C.P.R., has been elected President of the recently organized International Stewards' Association of Canada, the membership of which comprises stewards, hotel proprietors and hotel managers.

Lord Strathcona has subscribed \$2,000 towards the erection of new buildings for the Portage la Prairie, Man., Exhibition Association, and has also sent \$5,000 and offered the use of his Montreal house for the entertainment of guests during the forthcoming Eucharistic Congress there.

R. B. Thomson, who died in New York recently aged 34, from the effects of an accident, was a son of the late W. Thomson, the first President of the Old Northern Ry., now part of the G.T.R. system; and a brother of Mrs. Polson, widow of the late F. B. Polson, President of the Polson Iron Works, Toronto.

Niblock & Tull, Calgary, Alta., have located on the ground floor of the Grain Exchange Building, where they will handle their Atlantic Steamship agencies, real estate business, etc. D. B. Niblock was in the C.P.R. service for several years, among other positions being passenger agent at Calgary and Brandon.

Dunsmuir Castle, Victoria, B.C., which was built by the father of Jas. Dunsmuir, formerly President of the Esquimalt and Nanaimo Ry., at a cost of \$300,000, has been sold. Three acres of land go with the residence, the remainder of the grounds having been sold in lots, of which over 120 were sold at \$2,750 each.

Capt. Tatlow, formerly a member of the British Columbia Government, died at Victoria, B.C., April 10, as a result of being thrown out of his carriage a couple of days previously. He married in 1893, Miss E. M. Cambie, daughter of

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GENERAL SALES AGENTS

H. J. Cambie, then Division Engineer C.P.R., now Chief Engineer Esquimalt and Nanaimo Ry.

M'ss Clara Hays, daughter of the G.T.R. President, is to be married to Hope Scott, at Montreal, June 9.

R. Wright, who retired from the position of Treasurer of the G.T.R. in 1894, died in Montreal, April 5, aged 78. He entered railway service in England in 1858, joining the London staff of the G.T.R. in 1862, and came to Canada two years later. He subsequently became Treasurer at Montreal, which office he retained until his retirement in 1894.

J. S. Carter, who has been appointed General Agent Passenger Department C.P.R. Atlantic Steamship Lines, Winnipeg, has been in the C.P.R. service for a number of years. He was for some time ticket agent at Winnipeg, and from 1901 to 1907 was District Passenger Agent at Nelson, B.C., and was transferred to Spokane, Wash., as General Agent on the opening of the Soo-Spokane Line.

D. T. Main, whose appointment as District Master Mechanic C.P.R., Nelson, B.C., was announced in our last issue, was born at Kirkintilloch, Scotland, and came to Canada in 1903, when he entered Mackenzie, Mann & Co.'s service as draughtsman, and in 1904 entered C.P.R. service, and was from 1907 to Mar. 1908, locomotive foreman at Minnedosa, Man.; from Mar. 1908 to Mar. 1910, locomotive foreman at Cranbrook, B.C.

M. S. Blaiklock, whose portrait appear on the first page of this issue, was born at Quebec, July 19, 1859, and entered railway service in 1880, since when he has been, to 1889, Assistant Engineer G.T.R.; 1889 to 1891, Assistant Engineer St. Clair Tunnel; 1892 to 1896, Inspector G.T.R.; 1896 to Apr. 1902, Resident Engineer Eastern Division G.T.R., Montreal; Apr. 1902 to Oct. 1907, Superintendent Eastern Division G.T.R., Montreal; Oct. 1907 to date, Engineer Maintenance of Way G.T.R., Montreal.

Jas. Leitch, K.C., Chairman of the Ontario Railway and Municipal Board, while investigating a Toronto St. Ry. case in his office in Toronto on April 5, suddenly lost the sight of his right eye, owing to the rupture of a blood-vessel. It is not anticipated that the loss of sight will be permanent, but it will take some months of rest and treatment to restore the sight and to correct the conditions which caused the hemorrhage. A. B. Ingram, Deputy Chairman, is acting as Chairman during Mr. Leitch's absence.

G. A. Walton, who has been appointed General Agent Passenger Department C.P.R., at Spokane, Wash., was born at Montreal, July 17, 1881, and entered railway service June, 1897, since when he has been, to Aug., 1901, clerk in G.T.R. Passenger Department, Montreal; Aug., 1901, to Feb., 1903, rate clerk C.P.R. Passenger Department, Winnipeg; Feb., 1903, to Feb., 1906, chief clerk C.P.R. Passenger Department, Winnipeg; Feb., 1906, to Oct., 1907, C.P.R. station ticket agent, Winnipeg; Oct., 1907, to Apr. 11, 1910, District Passenger Agent C.P.R., Brandon, Man.

At the investigation into the Alberta and Great Waterway Ry. matter at Edmonton recently, it was stated that F. S. Darling, formerly Division Engineer of Construction C.P.R., Toronto, who is now in Edmonton, was sent there to take charge of construction in the interest of the Royal Bank. It was also stated that W. R. Clarke, President of the A. & G.W.R. received \$25,000 a year as President, J. A. L. Waddell, the Chief Engineer, receiving the same amount, with a bonus of \$75,000, of which \$30,000 was to be paid on the completion of the first 150 miles, and \$45,000 on the completion of the whole line. G. Seymour, Auditor, has a salary of \$4,800 a year.

Temiskaming and Northern Ontario Ry.

The annual report of the Commissioners recently issued, covers 10 months ended Oct. 31, 1909, is due to the fact that the Ontario Legislature has decided that the accounts for all provincial purposes shall be closed Oct. 31, instead of Dec. 31, as formerly. The railway has 252.3 miles of main line, 13.34 miles of branches, and 68.80 miles of yard and spur tracks; adding 0.64 miles of a spur at New Liskeard, under construction. This gives a total of 335.08 miles.

Following is the condensed statement of revenue account:—

Revenue from transportation.....	\$1,298,698 27
Other revenue	62,526 61
Total operating revenue.....	\$1,361,224 88
Operating expenses	794,796 88
Net operating revenue	\$566,428 00
Ore royalties	108,516 68
Hire of equipment	\$674,944 68
	19,073 47
Total earnings	\$655,871 21
Paid Treasurer of Ontario.....	550,000 00

Balance to Profit and Loss.... \$105,871 21
The operating expenses amount to 58.4% of the gross earnings, and the net earnings to 41.6%, as compared with 74.2% and 25.8% respectively in 1908. The offices in Toronto and North Bay are insured for \$34,225, and the other buildings, and insurable property on the line at \$1,958,799; while \$520,000 of employer's liability insurance, and \$90,000 of guarantee insurance is carried.

The report covers in detail the work done by the different departments during the 10 months, and also gives details of the contracts entered into. The general balance sheet follows:—

ASSETS.		
Property Owned.		
Cost of road to Dec. 31, '08	\$11,991,175.22	
Cost of road to Oct. 31, '09	1,850,768.00	
		\$13,341,943.22
Cost of equipment to Dec. 31, '08	1,450,529.67	
Cost of equipment to Oct. 31, '09	49,077.80	
		1,499,607.47
Less:—		
Net bonuses from mines	140,171.61	\$14,841,550.69
Advances townsite sales, less expenses	9,415.80	
		149,587.41
		14,691,963.28
Working Assets.		
Cash		122,431.99
Foreign freight balance		4,100.96
Net balance due from Agents and conductors		86,468.85
Accounts collectible		79,060.82
Materials and Supplies		315,040.02
		607,102.64
Deferred Debit Items.		
Paymaster's advance	8,000.00	
Treasurer's advance	50.00	
Insurance paid in advance	25,093.10	
Fire ranging (chargeable Nov. and Dec. '09)	4,240.98	
Advances contracts—McRae, Chandler & McNeil contract	127,000.00	
Construction account in suspense	422,610.96	
Other items in suspense	2,896.04	
		589,891.08
		\$15,888,957.00
LIABILITIES.		
Working Liabilities.		
Provincial Loan		\$15,338,338.69
Accounts payable inc. pay rolls	\$285,798.86	
Unclaimed wages	1,278.01	
Deposit on contracts	24,854.78	
Car mileage and per diem balance	5,733.29	
Foreign ticket balance	4,796.03	
Foreign telegraph balance	187.25	
		322,648.22
Free Surplus.		
Profit and Loss—Balance		227,970.09
		\$15,888,957.00

The rails which are used in the construction of the uncompleted and abandoned ship railway across the isthmus at Chignecto, N.S., after having seen some years' service on the Intercolonial Ry., are being re-rolled by the works of the Provincial Steel Co. at Cobourg, Ont. Originally weighing 110 lbs. to the yard, they are being rolled to 80 lbs. to the yard.

Too Late for Classification.

Detroit River Tunnel.—In their annual report for the year 1909, the Michigan Central Rd. directors say:—"The construction of the double tube tunnel under and across the Detroit River by the Detroit River Tunnel Co., the entire capital stock of which latter company is owned by this company, has progressed almost to completion. The open cuts and approaches on both sides of the river are finished, and the tunnel under the river is finished so far as to be open for use for the purpose of construction. There remains only to be completed a portion of the interior lining of the subaqueous tunnel and the tracks and electrification work. It is expected that the tunnel can be put into use during the early part of 1910. An arrangement has been made under the terms of which this company can acquire at any time, upon demand, the title to and possession of the property in the city of Detroit desired for the location of a proposed new passenger station, and a satisfactory ordinance passed by the city providing for the necessary closing of streets and construction of subways, etc., has been accepted by this company." We were advised April 15, that the contract work covering the construction of the tunnel will be completed in May. There will then remain two or three months' work in connection with the electrification to be done. It is expected that the tunnel will be in operation some time during the summer.

New York, New Haven and Hartford Rd.—Press reports from New Haven, Conn., April 12, state that consequent upon the G.T.R.-Central Vermont Ry. extension to Providence, R.I., the N.Y.

N.H. and H. Rd. will build two sections of line which will give it a direct connection with Sherbrooke, Que. It is said that surveys have been ordered to be made for a line from Brattleboro and South Vernon, and for a line between Windsor and White River Jet., and that construction will be started in the fall. The company secures its present connection over the Central Vermont Ry.

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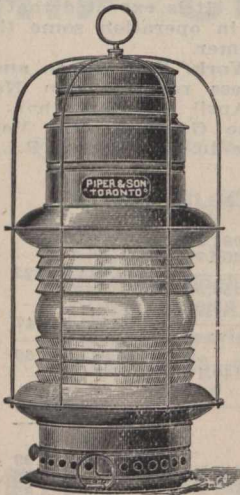
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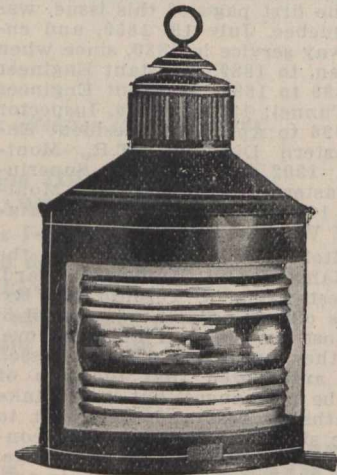
MANUFACTURERS OF



ANCHOR LIGHTS



MAST HEADS

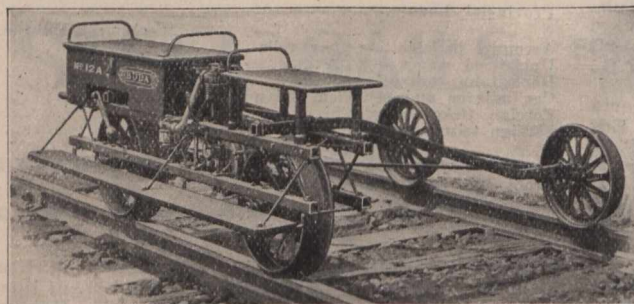


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TRANSPORTATION APPOINTMENTS.

The information under this head, which is almost entirely gathered from official sources, is compiled with the greatest care, so as to ensure absolute accuracy. Anyone who may notice any error in our announcements will confer a favor by advising us.

Canadian Northern Ry.—J. F. McGuire, who has been appointed City Ticket Agent, Winnipeg, vice W. Stapleton promoted to Canadian Northern Steamship service.

Canadian Northern Steamships Ltd.—D. B. Hanna, Third Vice President, Canadian Northern Ry., has also been appointed Second Vice President C.N.S. Office, Toronto.

P. Mooney, General Freight and Passenger Agent, Halifax and South Western Ry., has also been appointed General Agent, Freight and Passenger Departments, C.N.S., at Halifax, N.S. Territory includes Nova Scotia, Prince Edward Island, New Brunswick and Maine.

G. Tombs, General Freight and Passenger Agent, Canadian Northern Quebec, and Quebec and Lake St John Rys., has also been appointed acting General Freight and Passenger Agent C.N.S. Office, Montreal.

A. H. Davis, heretofore chief clerk C.P.R. steamship office, St. John, N.B., has been appointed Passenger Agent C.N.S. at Montreal.

J. B. Foote, formerly Superintendent Canadian Lake and Ocean Navigation Co., Toronto, who was recently appointed Marine Superintendent C.N.S. at Montreal, has resigned and has been succeeded by — Jones, who has been sent out from Great Britain by Capt. Gregory, Marine Superintendent at Bristol.

W. Phillips, General Freight and Passenger Agent Canadian Northern Ontario Ry., and General Eastern Agent Canadian Northern Ry., has also been appointed acting Traffic Manager C.N.S. office, Toronto.

H. C. Bourlier, heretofore in the Allan Line office, Toronto, has been appointed General Agent, Passenger Department, C.N.S., Toronto. Territory east of Port Arthur, Detroit and St. Clair River, and west of Kingston, Sharbot Lake and Pembroke, Ont. He will also perform other general duties allotted to him.

W. Stapleton, heretofore C.N.R. city ticket agent, Winnipeg, has been appointed General Agent Passenger Department C.N.S., for territory west of, and including Port Arthur, Ont. Office, 64 Scott Block, Main St., Winnipeg.

Canadian Pacific Ry.—Sir Wm. C. Van Horne has resigned the Chairmanship of the Board, but remains as a director.

H. P. Timmerman, heretofore Industrial Commissioner, lines east of Montreal, has been appointed Industrial Commissioner for the Atlantic and Ontario Divisions, and that portion of the Eastern Division east of Carleton Jct. Office, Montreal.

W. C. Casey, Travelling Passenger Agent, St. John, N.B., is reported to have been appointed chief clerk to General Passenger Agent Atlantic Steamship Service, Montreal.

J. R. Watson, heretofore dining car conductor, has been appointed Inspector Sleeping and Dining Car Department, Headquarters, Montreal.

H. N. Hooper, heretofore Assistant Agent Sleeping and Dining Car Department, Ottawa, has been appointed Agent same department there, vice E. A. Tupper assigned to other duties at Toronto.

E. A. Tupper, heretofore Sleeping and Dining Car Agent at Ottawa, has been appointed News Department store-keeper at Toronto.

J. S. Carter, heretofore General Agent at Spokane, Wash., has been appointed General Agent Passenger Department Atlantic Service at Winnipeg, vice S. J. Sharpe resigned to enter private business in Toronto. He will have charge

of the entire west for the Atlantic Steamship Service, reporting to the General Passenger Agent Atlantic Steamship Lines, Montreal.

A. G. Richardson, heretofore City Passenger Agent, Portland, Ore., has been appointed City Passenger Agent, Winnipeg.

J. E. Proctor, heretofore District Passenger Agent, Calgary, Alta., has been appointed District Passenger Agent, Brandon, Man., vice G. A. Walton, promoted.

R. A. Gamble, heretofore Inspector Refrigerator Service, Winnipeg, has been appointed Fuel Agent Western Division, vice J. F. Kane resigned. Office, Calgary, Alta.

R. G. McNeillie, heretofore Passenger Agent Nelson, B.C., has been appointed District Passenger Agent at Calgary, Alta., vice J. E. Proctor transferred.

J. W. Marshall, heretofore assistant car foreman at Winnipeg, has been appointed car foreman at Lethbridge, Alta., vice E. Y. Brake transferred.

J. Rutley, heretofore locomotive driver, has been appointed road foreman of locomotives, District 4, Western Division, Macleod, Alta., vice L. E. W. Bailey resigned.

E. Y. Brake, heretofore car foreman at Lethbridge, Alta., has been appointed car foreman at Cranbrook, B.C., vice A. McCowan resigned.

W. J. Wells, heretofore Travelling Passenger Agent, Brandon, Man., has been appointed District Passenger Agent at Nelson, B.C., vice R. G. McNeillie transferred.

O. Johnson has been appointed Roadmaster between Farron and Midway and the Phoenix Branch, District 3, Pacific Division, vice T. H. Nichols transferred. Office, Nelson, B.C.

Jno. Anderson, heretofore Roadmaster Mountain section and Arrow Lake branch, Revelstoke, B.C., has been appointed Roadmaster from Field to mileage 72.6 main line. Office, Golden, B.C.

T. H. Nichols, heretofore Roadmaster on District 3, Pacific Division, has been appointed Roadmaster from mileage 72.6 main line west of Field to Revelstoke, and Arrow Lake branch. Office, Revelstoke, B.C.

F. W. Walker, heretofore acting Superintendent, District 3, Pacific Division, Nelson, B.C., has been appointed Rules Instructor for the Pacific Division. The appointment is only a temporary one, and he will travel over the whole division giving instructions in the new rules.

W. E. Kingston, heretofore assistant chief clerk General Manager's office, Winnipeg, is reported to have been appointed chief clerk to General Superintendent Pacific Division, Vancouver, B.C., vice W. B. Semmens resigned to enter private business.

C. Adez has been appointed acting Travelling Fireman, District 2, Pacific Division, Headquarters Vancouver, B.C.

F. X. LaPrairie, heretofore Car Inspector at Kenora, Ont., has been appointed wrecking foreman at Vancouver, B.C.

H. D. Annable, heretofore General Freight Agent Atlantic Steamship Service, London, Eng., has been appointed Assistant Foreign Freight Agent at New York, vice C. W. Sellers, Assistant Export and Import Freight Agent resigned. Office, 1 Broadway.

G. A. Walton, heretofore District Passenger Agent, Brandon, Man., has been appointed General Agent Passenger Department, Spokane, Wash., vice J. S. Carter, promoted.

L. F. Knowlton has been appointed City Passenger Agent at Portland, Ore., vice A. G. Richardson transferred.

Duluth, South Shore and Atlantic Ry. Mineral Range Rd.—A. W. Martin has been appointed Travelling Passenger Agent at Duluth, Minn.

Grand Trunk Pacific Ry.—The following agents have been appointed:—Ingelow, Man., J. A. Lachance; Spy Hill, Sask., S. F. Beamish; Waldron, Sask., W. H. McDonald; Raymore, Sask., C. S. Brydges; Scott, Sask., L. C. Pearson; Chauvin, Alta., J. A. McKinnon. The station at Grandora, Sask., has been closed.

Press reports state that W. Duperow, Travelling Passenger Agent G.T.R., Toronto, will be appointed Passenger Agent G.T.P.R., at Prince Rupert, B.C.

R. Beaumont, heretofore General Agent Northern Navigation, Port Arthur, Ont., has been appointed Assistant to the Manager G.T.P.R. Pacific Coast service, Vancouver, B.C.

Grand Trunk Ry.—J. H. Taylor, heretofore Assistant Claims Agent, has been appointed acting Claims Agent (Personal Injuries), vice S. Wells, deceased. Office, Montreal.

W. J. Nixon has been appointed acting Chief Train Dispatcher at Montreal, vice P. G. Flaherty.

P. G. Flaherty, Chief Train Dispatcher, Montreal, has been appointed acting Master of Transportation, Eastern Division, vice S. B. Kramer, who has been granted three months' leave of absence. Office, Montreal.

Press reports state that C. E. Jenney of the Toronto city ticket office, will be appointed Travelling Passenger Agent at Toronto, to succeed W. Duperow, who, it is reported will be appointed Passenger Agent G.T.P.R. at Prince Rupert, B.C.

G. H. Wyatt has been appointed General Foreman at Nichols, Mich., vice G. F. Dick transferred.

G. F. Dick, heretofore General Foreman at Nichols, Mich., has been appointed General Foreman at Milwaukee Jct., Mich.

F. W. Egan, Superintendent Western Division, having been granted leave of absence, the following changes became effective Apr. 22, and until further notice:—

J. H. Ehrke, Assistant Superintendent, Battle Creek, Mich., has been appointed acting Superintendent. Office, Detroit, Mich.

F. G. Bement, heretofore Trainmaster, Durand, Mich., has been appointed Trainmaster District 25, Main Line, and District 26. Office, Battle Creek, Mich. All reports heretofore made to the Assistant Superintendent, will hereafter be made to the Trainmaster.

O. F. Clark, heretofore Chief Dispatcher, Battle Creek, Mich., has been appointed Trainmaster District 25, (C.S. & M.), Districts 27, 28 and 29 and Pontiac, Oxford and Northern Rd. Office, Durand, Mich.

The following agents have been appointed: Brechin, Ont., J. McLeod; Alma, Ont., A. Yaeck; Morrefield, Ont., J. A. Scott; Harriston, Ont., S. D. Croft; Greenfield, Ont., H. L. Abrams; Moose Creek, Ont., O. Parent (temp.); Rockland, Ont., O. Parent; Kingsville, Ont., J. L. Mander (outside).

Inland Navigation Co.—L. A. W. Doherty, heretofore assistant to General Manager has been appointed Traffic Manager in full charge over all Lake Ontario and westbound package freight traffic. Office, Hamilton, Ont.

Intercolonial Ry.—S. G. Tiffin, heretofore Travelling Agent, Toronto, has been appointed Agent there vice N. Weatherston, superannuated.

Intercolonial Ry.—W. E. Barnes, heretofore draughtsman in the drawing office at Moncton, has been appointed Locomotive and Roundhouse Inspector.

International Ry. of New Brunswick.—The operating staff has been appointed as follows:—Manager, E. H. Anderson; Traffic Manager, A. A. Andrew; Ticket Agent, E. B. Price; Freight Agent, G. McRae; Chief Engineer, D. W. Brown.

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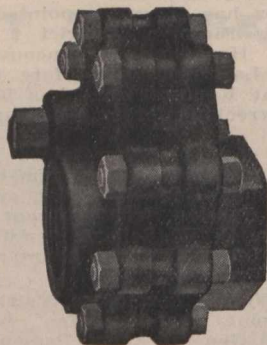


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The Irondale, Bancroft and Ottawa Ry., control of which was secured by Mackenzie, Mann & Co., is being operated under lease by the Central Ontario Ry., of which G. Collins is General Manager.

New York Central Lines.—L. Drago, who has been telegraph operating for the G.T.R. at Niagara Falls, Ont., since the Clifton Hotel, there, closed for the winter, will resume his former position as N.Y.C. ticket agent at the hotel, when it reopens in May.

Orders by the Railway Commissioners.

The following orders have been passed in addition to those on p.p. 363 and 365:—

- 10117. Apr. 12.—Adding Montreal St. Ry., Bell Telephone Co., G.N.W. Telegraph Co., C.P.R. Telegraphs, and others as parties to resolution of Montreal Chamber of Commerce, respecting level crossings, and fixing Apr. 28 for hearing at Montreal.
- 10118 to 10122. Apr. 7.—Relieving G.T.R. from providing further protection at crossings at first highway south of Henfryn; at second highway south of Hawkesbury, and at Saugeen Road, two miles south of Kin-cardine, Ont.; and similarly relieving C.P.R. regarding crossings at second highway west of The Brook, between lots 18 and 19, cons. 6 and 7, Russell Co., and at mileage 21.5, Osgoode tp., Ont.
- 10123, 10124. Apr. 6.—Declaring that C.P.R. Daniel St. and John St. crossings, Arnprior, Ont., are protected to the Board's satisfaction.
- 10125. Mar. 24.—Dismissing P. S. Seager's application for order directing P.M.R. to provide undercrossing on lot 6, Moore tp., Ont.
- 10126 to 10128. Apr. 9.—Authorizing Ontario Hydro-Electric Power Commission to erect telephone and relay wires across G.T.R. at three points.
- 10129. Apr. 13.—Approving agreement of Norfolk County Telephone Co. with Bell Telephone Co. respecting connections at Waterford, Scotland, Delhi, Simcoe, Otterville, and Port Dover, Ont.
- 10130. Apr. 13.—Approving C.P.R. plan showing interchange track with G.T.R. at Galt, Ont.
- 10131. Apr. 12.—Approving plan of proposed bridge over highway at mileage 24.2, C.P.R. Port Burwell Branch, near Straffordville, Ont.
- 10132. Apr. 12.—Authorizing C.P.R. to use bridge at mileage 1 of its Napinka section, Man.
- 10133. Apr. 5.—Authorizing A. C. Beatty to place telephone wires across G.T.R. at Garden Hill, Ont.
- 10134 to 10141 inclusive. Apr. 11.—Authorizing Ontario Hydro-Electric Power Commission to place telephone and relay wires across various railways at eight points.
- 10142. Apr. 12.—Ordering C.P.R. within 60 days to install electric bell at Thomas St. crossing, mileage 20.67, London section, Ont.
- 10143, 10144. Apr. 12.—Authorizing C.N.O.R. to build across private roads between lots 32 and 33, con. 2, Pickering tp., and between lots 28 and 29, con. A, Hamilton tp.
- 10145 to 10147. Apr. 12.—Ordering G.T.R., within 60 days, to install electric bells at crossings 3 1/2 miles east of Lennoxville station, Ont., and east of St. Madeleine station, Que.; similarly ordering C.P.R. respecting Queen St. crossing, Streetsville, Ont.
- 10148. Apr. 12.—Authorizing C.P.R. to build

spurs to Superior Portland Cement Co.'s premises, Orangeville, Ont.

- 10149. Apr. 5.—Approving location plan of C.P.R. station at Clive, Alta.
- 10150. Apr. 12.—Approving location of C.P.R. Regina, Saskatoon and North Saskatchewan branch from mileage 95.8 to 132.
- 10151 to 10153. Apr. 12.—Authorizing C.P.R. to use bridges at mileages 147.5, Portal Section; 118.0 Estevan Section, and 34.5, over Badger Creek, Napinka Section, Man.
- 10154. Apr. 8.—Relieving G.T.R. from providing further protection at crossing at first public road north of Fultons, Ont.
- 10155, 10156. Apr. 12.—Ordering G.T.R. and C.P.R., within 60 days, to install electric bell at crossings at Main St., Mount Brydges, and Manvers Road, Pontypool, Ont.
- 10157, 10158. Apr. 8.—Relieving G.T.R. from providing further protection at crossings five miles west of Bright, and at St. George St., Fergus, Ont.
- 10159. Apr. 5.—Ordering C.N.Q.R. to maintain watchman between 7 a.m. and 7 p.m. daily, at LaSalle Ave. crossing, Maisonneuve, Que., to flag engines and cars.
- 10160. Apr. 12.—Releasing certain lands on Scotland and Bell Aves., Winnipeg, from the operation of plan showing G.T.P.R. location.
- 10161. Apr. 14.—Authorizing C.P.R. to build spur for Robert Bell Engine and Thresher Co., Winnipeg.
- 10162, 10163. Apr. 14-13.—Authorizing G.T.R. to build spurs to D. G. Cooper's premises and Bryan Mfg. Co.'s premises, Collingwood, Ont.
- 10164. Apr. 5.—Authorizing C.P.R. to take certain lands on the Columbia and Western Ry.
- 10165. Apr. 5.—Dismissing application of H. G. Hannan, of Kipp, Alta., for order directing C.P.R. to provide station and sidings on s.w. 1/4 of sec. 29, tp. 9, r. 22, w. 4 m., Alta.
- 10166. April 5.—Adding city of Hull, Que., as party in R. Quain's complaint against alleged dangerous condition of C.P.R. crossing near Matthews' Pork Factory.
- 10167. Apr. 5.—Rescinding order 7931, Sept. 1, 1909, which approves of change C.P.R. location from its Crow's Nest Pass branch.
- 10168. Apr. 18.—Authorizing C.P.R. to build across private road between lots 6 and 7, con. 4, Darlington tp., Ont.
- 10169. Dec. 8, 1909.—Ordering that general plans and specifications of work called for by part 1 of Toronto grade separation, shall within two months be filed by G.T.R. for approval and copies furnished to city of Toronto and Etobicoke and York tps.; that subway at Queen St., Toronto, known as Sunnyside crossing, shall be 65 ft. wide; that G.T.R. shall commence the work before May 1, and shall complete the separation of grades at the several crossings within two years.
- 10170. Apr. 18.—Approving Nipissing Central Ry. Standard Passenger Tariff.
- 10171. Apr. 18.—Ordering C.P.R. to make approaches to crossing at mileage 47.31, between cons. 8 and 9, Puslinch tp., Ont., 20 ft. wide and re-fence approaches to conform to the Board requirements under its general regulations affecting highway crossings, Jan. 26, 1909.
- 10172. Apr. 18.—Authorizing city of Edmonton, Alta., to build highway across Edmonton, Yukon and Pacific Ry. within city limits.

The Canadian Society of Civil Engineers, Ottawa branch, has its headquarters at 177 Sparks St. A. A. Dion is acting chairman, owing to the illness of W. J. Stewart, S. J. Chapleau is Secretary. Meetings are held every Wednesday, except in June, July and August.

Economy in Locomotive Repair Shops.

By W. R. Smith, General Foreman, Canadian Northern Ry. Shops, Winnipeg.

The subject upon which I have endeavored to compile this paper is a very broad one, in fact there are very few railway problems upon which there has been more comment and discussion than that of economy in locomotive repair shops. Possibly, on account of the mechanical department not being directly a revenue bearing department, greater attention has been paid to it as regards the organization in its various branches, than to any other department, in connection with railway work. To bring this matter before you in detail would occupy a very considerable length of time, therefore, I shall only mention points which are of the greatest importance in connection with shop practice. The first of these which I wish to bring to your notice is the storing of material, particularly heavy material, such as tyres, boiler plate, tubes, bar iron, etc., etc. All these should be located as near as possible to the shop in which used, and stored in properly erected buildings or racks, suitable for the purpose required, thus reducing delay on the part of the shop staff to a minimum, and at the same time placing such material under cover that would otherwise be subjected to atmospheric conditions, causing the material to depreciate in value, on account of corroding and pitting, thus reducing the length of service and thereby increasing the cost of the manufactured article. The buildings referred to should be thoroughly equipped with small cranes or lifting devices, to eliminate hard labor and facilitate rapid handling. The use of magnetic power on locomotive cranes now in use in the majority of modern plants, has proved very effective, and has been found to be a labor saving device. It would not be an extensive plant that would not require at least 20 men to perform duties of this nature, without proper facilities, which could be handled by the use of a crane of this type with about five men, effecting an approximate estimate in wage economy of about \$8,000 a year.

You will, therefore, see that the saving would aggregate a much higher figure than would be considered creditable by those not conversant with engine repairs. There is one other point on the material question, through which the mechanical department can be subjected to numerous inconveniences and disadvantages, detrimental to the working progress which necessity terminates in increased expense; I speak of the purchasing and supplying of the proper quantity and quality of material at the required time, it being a very essential feature in economy. In this particular line of railway business, it appears to me, after personal experience of several years with four different railway companies, that if those in authority in such matters, acted as far as consistent in supplying the make or quality of material specified by the head of the mechanical department, it would assist materially in economy. It can be readily understood that it is practically impossible for the latter to obtain the best results, in frugal efficiency, without the support of the purchasing department. The fact cannot be denied, however, that cases do occur, through some neglect or oversight on the part of the mechanical department, in not advising the stores or purchasing officials of the consumption of an unusual amount of a certain class of material, or the necessity on the part of the latter to place an order for a commodity which it has not previously been customary to carry in the ordinary stock, thus placing that department in an unfair position through not being allowed sufficient time to obtain delivery.

Locomotive Fuel Consumption.

The cost of fuel consumed by locomotives on the various Canadian railways during the year ended June 30, 1909, was \$17,544,449. In volume the aggregate consumption was 6,832,108 tons, against 5,970,791 in 1906-07. Following are details, two cords of wood being calculated as one ton of fuel:

Class of Locomotive.	COAL		WOOD		Total	Miles Run.	Fuel consumed per 100 miles
	Anthracite	Bituminous	Hard.	Soft.			
	Tons.	Tons	Cords.	Cords			
Freight	4,534	3,816,810	1,138	21,809	3,833,010	43,280,549	8.85
Passenger	2,600	1,824,836	595	13,739	1,834,700	32,282,534	5.68
Mixed	2,314	406,963	364	2,566	410,800	7,237,422	5.67
Switching	227	740,944	91	5,492	743,977	14,832,834	5.01
Special .....	.....	9,595	.....	52	9,621	231,986	4.14
Total	9,675	6,799,148	2,188	43,658	6,832,108	97,865,325	.....

The average cost of fuel per 100 miles was:—freight, \$22.65; passenger, \$14.54; mixed, \$14.51; switching, \$12.82; construction, \$10.59.



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One matter to which strict attention should be paid is the tracing of orders for material after being placed. I could relate instances where it would be impossible for a mechanical department to correctly account for excessive charges through failure on the part of a manufacturer to supply material within a reasonable time. As we know the manufacturer's tendency is to grasp all the business possible, with the result that it frequently takes double the necessary time to get deliveries made. I have known cases where six months has been taken where 30 days under ordinary circumstances should be ample time. This is an expensive proposition and one that should not be tolerated by a railway company, as the ultimate cost is perhaps 100% more than the actual value. This and other questions of a similar nature prompt me to state that the most improved business methods, possible to adopt, relative to these three departments, are in the best interest of the company.

In referring to what is conceded by many to be the principal cause of high figures in mechanical labor, being that of the present standard rates of wages, we are all aware that conditions in this particular have made a wonderful advance in the past ten years. Still, expensive locomotive repairs must not always be solely attributed to this fact, as there are comparisons for consideration in what might be termed the ancient and modern methods in applied mechanics found in shop practice. The rapid strides accomplished in the mechanical sphere of late years, are more than equal to those which have taken place in any one particular in railway records. It is well said that time is money, and in this age of comparison, rapidity should be the point at issue in every performance in locomotive repairs, in order to keep pace with the records which are now being continually made in modern shop efficiency.

I do not propose entering upon a discussion of the numerous improved appliances, but by way of comparison I remember only a few years ago, in what was at that time one of the largest shops in Canada, where an employe welding boiler tubes after 10 hours of strenuous labor would have about 100 tubes welded. To-day it is possible by the use of certain machines, without any more exertion on the part of the operator, to weld 600 tubes in the same length of time. Take for instance the enormous amount of manufactured material produced by the use of the modern blacksmith shop machinery. Then consider the modern moulding department as compared with that of 10 years ago, and we find an increase in the output ranging from 100% up, and not only a higher grade of casting, but more accurate, requiring less machine work thereby reducing the cost of manufacturing in every particular, due to the use of moulding machine. The same progress may be applied in speaking of the boiler shop, as 75% of the operations which were manual labor, a few years ago, are now minor details, through the use of hydraulics and compressed air.

The tool and machine shops have, with high speed steel and high grade improved machinery, shown no small display in the advanced superiority of shop efficiency, and in view of the existence of such conditions, the fact, beyond a doubt is clearly demonstrated, that the adopting of modern methods and such machinery, is of vital importance to a mechanical staff who are expected to compete with the competitors of this decade, for never in the history of railroading has there been such efficiency developed in railway mechanics as in that of the past 10 years, which goes to prove that all companies to-day occupying an important position in the handling of freight

and passenger traffic, must of necessity keep their motive power in first class condition, there being nothing that will reflect discredit upon a company quicker, than neglect in this department. By this it is understood that shop equipment for locomotive repairs, is an essential question and should warrant due consideration, in order that economy is brought to prevail, which necessitates close inspection of all details in daily shop practice, as the small matters count in the question of time and labor, which is money, and in the performance of such duties, system is required to be observed in every particular governing the delivering of material to the respective departments, also the disposing of scrap materials, and the various relations between the foremen, in order that the work in each and every department, be advanced to the best interests of all concerned.

Another important item in this connection, is the checking of the costs of work performed each day. In order to have correct information with reference to the cost of locomotive repairs, it is necessary to obtain a daily check, to prevent any mistakes being made by the employes on their time distribution slips, which are commonly used in time-keeping in locomotive repair shops. This places the foreman directly in charge of engine erecting or machine work in a position to explain why certain repairs on any particular engine should cost more than the same repairs on another engine of the same type. To obviate such difficulties I am convinced that a system adopted about a year ago by A. Shields, Master Mechanic Canadian Northern Ry., which is known as the "engine repair account" and is only used in general repair shops, or what is generally termed "back" shop, is one of the most convenient methods to be found in checking cost of engine repairs, i.e. from a mechanical department's point of view. It must be admitted that it entails extra time in stores accountant's office. It is a system of itemized charges against repairs by the use of consecutive numbers, which are used to specify every piece of work on an engine, and is as follows:—

ACCOUNT—REPAIRS TO ENGINES.

1. Stripping.
2. Repair rods.
3. Take off Frame, r. or l.
4. Repair Frame, r. or l.
5. Put on Frame, r. or l.
6. Remove cylinders no.
7. Apply cylinders no.
8. Boring cylinders no.
9. Bush cylinders no.
10. Repairing cylinders no.
11. Firebox—new or repairing.
12. New front flue sheet.
13. New back.
14. New inside sheets, r. or l.
15. New outside sheets, r. or l.
16. New door sheet.
17. New wagon top.
18. New face plate.
19. New throat sheet.
20. New crown sheet.
21. Boiler.
22. Smoke Box—new or repairs.
23. Washout plugs and holes.
24. Tank repairs.
25. Remove flues.
26. Repair flues.
27. Replacing flues.
28. Front end arrangement and netting.
29. Ashpan and rigging.
30. Air pump, air signal and steam heat.
31. Driving brake and rigging.
32. Driving boxes, hub liners and eccentric straps.
33. Repairs to shoes, wedges and horn blocks.
34. Deck casting.
35. Deck beam brackets and wind sheets.
36. Hanging motion and setting valves.
37. Repairs to engine trucks.
38. Steam and exhaust pipes.
39. Dry pipe and throttle rigging.
40. Valve seats, bushes and chests.
41. Pistons and crossheads.
42. Guide bars and blocks.
43. Spectacle plate.
44. Repairing valve gear and motion.
45. Driving tires, wheels, crank pins.
46. Boiler mountings, injectors, pops and lubricators.
47. Lagging.
48. Jackets.

49. Piping.
50. Engine bell.
51. Headlight.
52. Smoke stack and base.
53. Front end ring and door.
54. Expansion and running board brackets.
55. Springs and spring riggings.
56. Wheeling and putting-up binders.
57. Pilot, buffer beam brackets and front coupler.
58. Cab running boards and deck floor.
59. Sand box, dome casting and hand rails.
60. Painting engine and tender.
61. Tank frame repairs and draft gear.
62. Trucks and Brake rigging.
63. Miscellaneous.

Stripping an engine is account no. 1, repairing rods account no. 2, and so on; the highest number is 63, it being a miscellaneous account which covers all extra or unusual charges. It is worked in this way:—Presuming a machinist has worked all day on boiler mountings (account 46). On his time slip he writes the date, engine number and 9 hours account 46, which is all that is necessary. Each morning all slips are collected from ticket boxes, and charges recorded by the mechanical department, previous to sending slips to the timekeeper. The form used for this purpose has the dates printed on the top line and the account numbers on the right side, so that all that is necessary is to place the amount charged under the date and opposite the account number. There is one form for each engine in the shop for each month. By this you will understand that at a glance, the cost of labor on every piece of work in the shop can be obtained daily. Charges for material, of course, can only be got at the end of each month, when accounts are closed by the stores department. It is understood of course, that due credit is received for scrap material. Some companies use the shop order system. In this every piece of work has a different number, being confusing on account of high figures, which would run into the thousands every month. With the account system, a certain piece of work on every engine is always the same number, with which the employes become familiar and thus avoid mistakes on their time slips. It may be possible to improve on this system, but I must say, if properly carried out, it is the best arrangement in the interest of the mechanical department that I have used.

The foregoing paper was read before the Western Canada Railway Club recently.

Canadian Freight Association.

At the annual meeting in Montreal Apr. 14, the following officers were elected:—President, M. H. Brown, General Freight Agent, C.P.R., Toronto; 1st Vice President, C. A. Hayes, General Freight Agent, G.T.R., Montreal; 2nd Vice President, B. R. Hepburn, General Manager Ontario & Quebec Navigation Co., Picton, Ont.

Advisory Committee:—J. Pullen, Assistant Freight Traffic Manager, G.T.R., Montreal, Chairman; W. B. Bulling, Assistant Freight Traffic Manager, C.P.R., Montreal; G. C. Ransom, Division Freight Agent, M.C.R., Buffalo, N.Y.

Executive Committee:—C. A. Hayes, F. F. Backus, G.T. & P.A., Toronto, Hamilton & Buffalo Ry., Hamilton, Ont., and S. P. Howard, General Freight Agent C.P.R., Montreal.

Classification Committee:—W. B. Bulling, C. A. Hayes, Wm. Phillips, F. J. Watson, S. P. Howard, W. M. Kirkpatrick, L. S. Macdonald, A. E. Rosevear, H. E. Macdonell and R. E. Perry.

Inspection Committee:—R. W. Long, G. Tombs, F. Conway, R. W. Youngs, J. Paul, G. T. Pettigrew, B. R. Hepburn, S.P. Howard, W. B. Bamford and F. J. Balch.

The next quarterly meeting will be held at Penetanguishene, Ont., July 14.

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G.T.R. Semi-Annual Meeting.

The semi-annual meeting was held in London, Eng., Apr. 14, when the report for the half-year ended Dec. 31, 1909, was presented. The following summary shows a comparison of the revenue for that period, with that for the corresponding period 1908:—

	1909.	1908.
£3,326,158	Gross receipts	£3,632,902 18 1
2,407,631	Deduct— Working expenses, being at the rate of 75.79%, as compared with 72.38% in 1908.	2,753,142 17 0
918,527	Net traffic receipts	879,760 1 1
41,901	Balance of income from rentals, outside operations, and car mileage.	39,953 3 10
£960,428	Total net revenue.	£919,713 4 11
16,013	Add— Amount received from International Bridge Co.	16,012 16 7
6,507	Interest on bonds of Central Vermont Ry.	6,506 143
68,739	Interest on securities of controlled lines and on St. Clair Tunnel bonds acquired by issue of G.T.R. 4% debenture stock	68,743 9 5
42,626	Balance of general interest account	27,630 17 3
£1,094,313	Net revenue receipts	£1,038,607 2 5

The following are the net revenue charges compared with the corresponding period, 1909:

	1909.	1908.
£ 77,603	Rents, leased lines.	£ 77,603 0 9
498,624	Interest on debenture stocks and bonds	508,571 9 9
36,395	Interest on debenture stock and bonds of consolidated lines	36,589 4 5
43,378	Canada Atlantic Ry. deficit	17,367 16 9
£656,000	Deduct Detroit, Grand Haven, and Milwaukee Ry. surplus	£640,131 11 8
3,139	Leaving a surplus of	12,066 19 1
£652,861		£628,064 12 7
441,452		410,542 9 10
£1,094,313		£1,038,607 2 5

Following is a comparison of receipts for half-years ended Dec. 31, 1909 and 1908:

Description of receipts.	TRAFFIC STATISTICS	
	1909.	1908.
Passengers	1,091,426	1,041,423
Mails and express	182,855	169,302
Freight and live stock	2,252,106	2,014,205
Other receipts	106,516	101,228
	£3,692,903	£3,326,158
Passengers carried	6,212,275	194,715
Average fare per passenger	42.17d	0.64d
Tons of freight and live stock	9,265,763	8,086,716
Average rate per ton	58.83d	59.77d
Tons carried one mile	1,662,599,284	1,435,357,181
Earnings per train mile	87.61d	81.51d

Adding balance of £9,938 1s. 7d. at credit net revenue account on June 30, 1909, the amount available for dividend is £420,480 11s. 5d., from which the directors recommend the payment of the following dividends:

Half-year on 4% guaranteed stock £196,800 4 3
Half-year on first preference stock 85,420 15 0
5% on second preference stock. 126,420 0 8

£408,640 19 11
leaving a balance of £11,839 11s. 6d. to be carried forward to next half-year's account.

The average rate per ton per mile on the entire freight business was 0.68c., being the same as in the corresponding half-year.

The working expenses, excluding taxes, were £2,675,662 or 73.65% of receipts, as compared with £2,335,285, or 70.21%, in the corresponding half-year; an increase of 3.44% in the proportion to the gross receipts.

Following is a comparison of the revenue expenditure, including taxes, for half-years ended Dec. 31, 1909 and 1908; and

The train mileage of the half-year compares with that for the half-year ended Dec. 31, 1908, as follows:

Description of expenditure	1909.		1908.	
	Increase	Decrease	Increase	Decrease
Maintenance of way and structures	£ 508,399	£ 509,399	£ 440,929	£ 40,488
Maintenance of equipment	669,889	408,772	5,102,507	182,136
Traffic expenses	97,985	95,600	267,110	16,613
Conducting transportation	1,198,661	1,172,996	9,793,226	168,261
General expenses	80,529	88,618		
Taxes	77,481	72,346		
Total	£2,758,143	£2,407,631		
Percentage of gross receipts	75.78	72.38		
Expenditure per train mile	66.40d.	59.00d.		

The gross receipts show an increase of £306,745, or 9.22%; the working expenses, including taxes, £345,512, or 14.35%; and the train mileage 153,261 or 1.62%.

The equipment was increased during the half-year by the purchase of 1,000 steel coal cars, the cost of which, £183,204 16s., has been charged to capital account. During the half-year, £259,512 18s. 8d. has been charged to revenue in reduction of engine and car renewal suspense account, leaving the balance, £197,695 6s. 5d., of which £81,031 11s. was in respect of engines, and £116,663 15s. 5d. of cars.

The gross receipts of the Canada Atlantic Ry., for the half-year were £230,104, against £206,097 for the corresponding half-year, and the working expenses £188,480, against £188,525, leaving a net revenue balance of £41,624, against £17,572, which with the balance of income from rentals, outside operation and car mileage, makes a total net revenue of £42,746, against £19,723. The number of passengers carried was 290,729, against 275,871, an increase of 5.38%; and the passenger receipts, including mails and express receipts, were £49,006, against £47,298, an increase of 3.61%. The quantity of freight moved was 1,258,375 tons, against 1,192,452 tons in 1908, an increase of 5.53%; and the receipts from freight traffic were £171,079, against £147,443, an increase of 16.03%.

The gross receipts of the Grand Trunk Western Ry., were £637,166, against £588,971 for the corresponding half-year, and working expenses, £468,976, against £424,985, leaving net receipts

of £168,190 against £163,986, which with balance of income from rentals, outside operations and car mileage makes a total net revenue of £119,096 against £123,510. The net revenue charges were £93,307, against £99,187; so that there was on Dec. 31, 1909, a net revenue credit of £25,789, which is carried forward, as compared with £24,323 for the corresponding half-year 1908. The number of passengers carried was 1,052,197, against 919,597, an increase of 14.42%; and the passenger train receipts, including mails and express were £230,519, against £212,431, an increase of 8.51%. The quantity of freight moved was 1,740,216 tons, against 1,555,695, an increase of 11.86%, and the receipts from this traffic were £391,015, against £365,132, an increase of 7.09%.

The gross receipts for the Detroit, Grand Haven and Milwaukee Ry., were £219,978, against £188,969, and the working expenses £159,486, against £138,905, leaving net receipts of £60,492, against £50,064, which with balance of income from rentals, outside operations and car mileage, makes a total net revenue of £49,048, against £40,972. The net revenue charges were £36,981, against £37,833, so that there was a net revenue surplus of £12,067, as compared with £3,139 for the corresponding period of 1908. The number of passengers carried was 487,122, against 446,936, an increase of 8.99%; and the passenger receipts, including mails and express, were £75,032, against £68,167, an increase of 10.07%. The quantity of freight moved was 1,116,699 tons, against 925,289 tons in 1908, an increase of 20.69%; and the receipts from freight traffic were £125,074, against £100,659 in 1908, an increase of 24.26%.

Grand Trunk Pacific Railway.

The comparatively open winter has enabled favorable progress to be made with preparations for the early commencement of construction in the coming season, and the grading on the portions of the line for which contracts have recently been let,—from Wolf Creek westerly to Tete Jaune Cache, 179 miles, and from Copper River easterly to Aldermere, 135 miles—will, it is expected, be completed by the end of the current year. There still remains about 425 miles between Tete Jaune Cache and Aldermere for which contracts have not been let. Tracklaying has been commenced from Prince Rupert east to the Copper River, 130 miles, and should be completed by July 1. It is expected that the portion of the Government line from Winnipeg to Lake Superior Jct., 245 miles, will be in readiness for traffic by Sept. 1, so that this year's crops may be taken all the way from the West to the Great Lakes. The company's new terminal elevator at Fort William, with a capacity of 3,500,000 bush, will also be available for the handling of this year's crop. Satisfactory progress is also being made with the construction of branch lines in Saskatchewan and Alberta, under guarantees already given by those Provinces. The branches from Melville to Regina, Melville to Canora, in Saskatchewan, and Tofield to Calgary, in Alberta will, it is hoped, be completed by the end of 1910. Additional guarantees by Saskatchewan for further branch lines were obtained at the last session of the Legislature, for lines: from Regina south-easterly to the international boundary between the eastern limit of r. 32, w. p. m. and the western limit of r. 8, w. 2 m.—about 155 miles; from the G.T.P.R. within r. 26, 27, or 28 w. 2 m. northerly to Prince Albert—about 110 miles; from at or near Regina westerly to Moose Jaw, thence north-westerly about 110 miles to the south branch of the South Saskatchewan River; from the G.T.P.R. between the eastern limit of r. 11 and the western limit of r. 16 w. 3 m. south-

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westerly and westerly, 50 miles; from the line near tps. 41, 42 or 43, westerly and north-westerly, 50 miles. The company is under obligation to complete 150 miles of these five branches during 1910, the balance to be completed by Dec. 31, 1912.

Reports of Officers.

The Chief Engineer, H. G. Kelley, states that the length of the G.T.R. maintained and operated during 1909 was as in 1908, 3,536 miles. The bridges over the Richelieu River at Beloeil, and the Yamaska River just east of St. Hyacinthe station, have been completed, and there is in operation, continuous double track from Montreal, east to Ste. Rosalie Jct., 38.01 miles. The Ottawa terminal improvements are in progress. The baggage and express annex has been finished, and is being used for temporary station accommodation. Work has been started on both the new central union passenger station and the new hotel Chateau Laurier, and the contractors for these buildings are making satisfactory progress. The expenditure during 1909, for maintenance of way and structures, was \$4,384,252.58, against \$3,941,845.10 in 1908, an increase of a little over 11.22%. The outlay on track and permanent way, including ballast and ballasting, clearing snow, renewals of rails and ties, and also including their proportion of superintendence, was \$2,788,421.14 in 1908, or at the rate of \$788.58 per mile. In 1909, the amount was \$3,186,471.96, or at the rate of \$901.15 per mile, an increase of 14.27%. For renewal and repair of bridges, trestles, and culverts, the expenditure during 1909 shows an increase of \$164,241.33, or 97%, compared with the outlay during 1908, the figures being \$333,417.53 and \$169,176.20 respectively. The cost of repairs and renewals of buildings and fixtures amounted to \$549,246.49 in 1909, compared with \$640,340.55 in 1908, a decrease of nearly 14.23%. New stations have been built at Cumberland, South Indian, Ottawa (freight), Bluevale, Palmerston, Corinth, Omamee, Bay City, Halstead and Ashland Avenue stations, Chicago, Windiate Park, Milwaukee Jct., Ionia, Muskegon, Hickey, and South Lyon—16 in all.

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

All repairing charges, including Shop, machinery, tools and marine equipment, etc.	1909.		1908.	
	Cents.	Cents.	Cents.	Cents.
Repairs and renewals of locomotives	15.47	10.05	13.37	13.37
Train	12.17	7.85	10.46	10.46
Engine	1.01	0.62	0.82	0.82
Car	0.34	0.34	0.34	0.34

Total cost Half-year ended	Total miles run by cars.		Cost per mile.	
	Passenger.	Freight.	Car.	Train.
Dec., 1903	\$1,605,676	22,629,586	16.14	7.22
Dec., 1908	1,290,039	22,053,210	16.14	7.22

J. Coleman, Superintendent Car Department, reports expenditure, mileage, etc., as follows:

W. D. Robb, reports expenditure, mileage, etc., as follows:

Half-year ended	Total expenditure.	Train mileage.	Rate of Expense per mile.		
			Train	Engine	Car
Dec., 1909	\$4,849,724	9,951,487	48.73	38.53	2.96
" 1908	4,361,936	9,793,226	44.54	34.84	2.76

An increase in expenditure of 11.18% compared with an increase in train miles of 158,261 or 1.62%.

During the half-year one engine was sold and 20 were scrapped, leaving at the end of the half-year 29 old light capacity engines set aside to be scrapped. The actual stock at Dec. 31, was 874 engines.

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

	£	s.	d.
Freight	2,343,310	4	8
Less—			
Cartage, &c.	57,246	14	1
International Bridge tolls	13,123	14	0
St. Clair Tunnel tolls	21,833	18	9
Passenger	1,001,053	11	10
Less—			
International Bridge tolls	2,036	16	11
St. Clair Tunnel tolls	6,590	19	2
Mail and Express	182,855	1	10
Other Revenue from Transportation	66,921	19	11
Revenue from Operations, other than Transportation	381,594	2	9
Total	£3,632,902	18	1

EXPENDITURE.

	£	s.	d.
Maintenance of way and structures	17.31	0	0
Maintenance of equipment	18.44	0	0
Traffic expenses	2.70	0	0
Conducting transportation	32.99	0	0
General expenses	2.21	0	0
Total operating expenses	73.65	0	0
Taxes	2.13	0	0
Net income from rentals	75.78	0	0
Outside Operations—Dining car service balance	Cr.	1,371	4 5
Hire of equipment balance	Dr.	2,695,656	19 11
Balance to net income account		919,713	4 11
Total		£3,632,902	18 1

Grain Elevator Notes.

The Scott elevator at Dalny, Man., was burned Apr. 4, with about 12,000 bush. of wheat. The loss has been estimated at \$8,000, covered by insurance.

The Dominion Elevator Co.'s elevator at Moosomin, Sask., was burned recently, together with its contents, of about 14,000 bush. of grain.

The Globe Elevator Co., which built a 500,000 bulk elevator at Calgary, Alta., last year, is reported to have decided to double its capacity during the summer.

The Scott Elevator Co.'s elevator at Dalny, Man., was burned, with about 12,000 bush. of wheat, Apr. 4. The loss,

estimated at \$8,000, is covered by insurance.

The Edmonton Elevator Co., which has recently completed the foundation of an elevator at Monarch, Alta., is preparing the site for the erection of another at New Dayton.

The Alberta Pacific Co., will, it is stated, build elevators this year at Maple Creek, Walsh, Sask., and Tees, Alta., and will remove its elevator at Chigwell, to Clyve, Alta.

The Calgary Milling Co.'s elevator B at Calgary, Alta., with about 100,000 bush. of grain, was burned, Apr. 14. The elevator, which had a capacity of 250,000 bush., was built in 1905. The loss is quoted at \$300,000.

A privately owned elevator, one of three at that point, was destroyed by fire, at Eyebrow, Sask., Apr. 14, together with a C.P.R. box car and a quantity of grain. The elevator was to have been sold shortly to the Moose Jaw Milling Co.

The Farmers' Elevator and Trading Co., Ltd., of Craik, Sask., received tenders, Apr. 23, for the construction of a 60,000 bush. farmers' elevator, with 30 ins. 1,200 bush. bins, 6 ins. 2,300 bush. bins, balance in three bins, two dumps, two scales, large cleaner, gasolene engine and car puller.

A winding-up order has been made in respect of the Parkin Elevator Co., Ltd., of Hespeler, Ont., on the petition of N. A. Kribs, a creditor for \$868. The town of Hespeler holds a mortgage on the plant for about \$14,000, and there is about \$20,000 owing to the Merchants Bank of Toronto. The company's nominal capital is \$48,000.

The Prairie Elevator Co., Ltd., has been incorporated under the Dominion Companies Act, with a capital of \$100,000 and office at Winnipeg, to erect, own and operate grain elevators, and to carry on a general elevator business. The provisional directors are: R. Hume, Fort William, Ont., A. E. Choate, E. B. Eadie, R. Siderfin, C. S. Scott, A. G. Rattray, J. H. Sanders, Winnipeg.

The Maple Leaf Milling Co., Ltd., has been incorporated under the Ontario Companies Act, with a Capital of \$5,000,000 and head office in Toronto, to carry on a general business as grain millers, dealers, forwarding agents, etc., and to conduct a general elevator and warehouse business. The provisional directors are: H. Shaw, C. W. Band, C. Mulock, C. Wurtele, J. Carrick, S. H. Foster and C. S. Band, Toronto.

Press reports from Lethbridge, Alta., of Apr. 18, state that C. G. Bell, Secretary-Treasurer of the Western Farmers' Elevator and Milling Co., has absconded, after having issued a check for \$5,000, with only \$4 in the bank to meet it. It is stated that he has ordered \$15,000 worth of lumber for a number of elevators, which it is the company's intention to erect at various points on the Crows Nest Pass line, and at Bow Island.

The report of the Warehouse Commissioner at Winnipeg with regard to interior, terminal and eastern transfer elevator capacity, states that there are, in Manitoba, 312 stations having elevators with 21,624,500 bush. capacity, an increase in capacity of 772,000 bush. during the past year. In Saskatchewan, there are 330 stations having elevators with 24,279,000 bush. capacity, an increase of 76 stations. In Alberta, there are 121 stations having elevators with 8,050,400 bush. capacity. The number of stations and the capacity was practically doubled during the past year. In the west, there are 769 stations having 1,763 elevators in active operation, with a total storage capacity of 54,234,900 bush.

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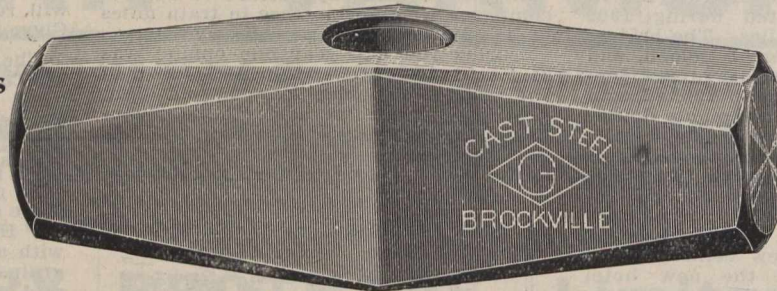
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Determination of Train Resistance.

By E. I. Wenger, B. Sc., Stud. Can. Soc. C.E.

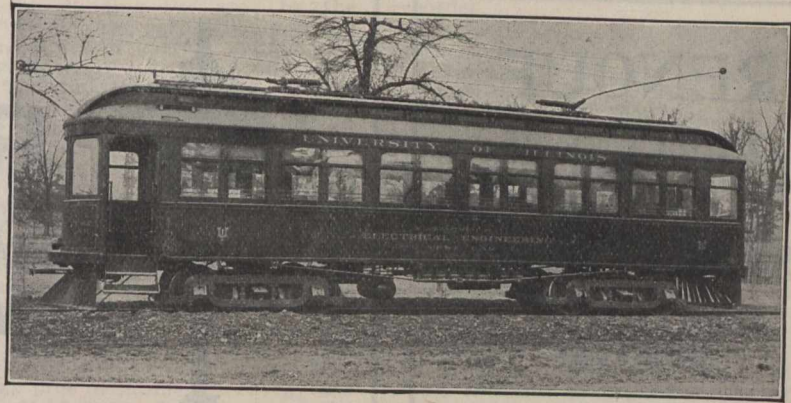
The rapid development of the use of electricity as a motive power for railway trains has led to the consideration of problems, which were relatively unimportant a few years ago.

The tractive resistance of electric cars being the foundation upon which is based the calculations leading to the selection of motive power, equipment has of late claimed considerable attention. Numerous formulæ have been developed, and a number of tests have been made to determine the train resistance of electric cars and trains. Amongst these may be mentioned the Buffalo and Lockport Ry. tests in 1900 by W. J. Davis, the Zossen high-speed tests in 1902-3, tests made by the Electric Railway Test Commission on the test car, Louisiana, in 1904-5, the New York subway tests in 1905, and tests on the New York Central locomotives in 1905-6. The majority of these tests were made under somewhat unusual conditions of track and equipment, and consequently the results obtained are not generally applicable to traction problems met with in the ordinary inter-urban railway. It was, therefore, with the object in view of obtaining information which would be useful in the selection of motive power equipment for inter-urban railways operating single car trains that a series of experiments was undertaken by the University of Illinois Railway Engineering Department.

The car used in making the tests to determine train resistance was a standard interurban car and formed part of the laboratory equipment of the Railway Engineering Department. The principal dimensions are as follows:

Length over all	45 ft.
Width over all	8 ft. 4 in.
Distance between truck centres	22 ft. 4 in.
Height from under side of sill to top of roof,	9 ft. 6 in.

The car is divided into two compartments, the smaller of which contains the recording instruments as well as part of the motor control apparatus. In the larger compartment are a motor generator for supplying low voltage current for bond testing, a water rheostat for regulating the voltage on the motors, and several other pieces of apparatus for work of a special nature. The trucks are of the C60 type. The wheels on one truck are rolled steel and on the other



Car used in making tests.

chilled iron. The wheel base is 6 ft. 4 ins., and the wheels are 33 ins. in diameter and have the M. C. B. tread and flange. The motive power equipment consists of four 101D Westinghouse motors, with a nominal rating of 50 h.p. The gear ratio is 22.62, thus giving the car a maximum speed of 45 miles an hour, with a pressure of 500 volts on the trolley-wire. The motor control is the Westinghouse unit switch system of multiple unit control. The switch group, circuit breaker, reverser, limit switch, and line relay are installed in the interior of the car for the purpose of inspection under operating conditions and instruction of students. The straight air brake system was used, hand brakes being installed for use in emergencies.

The instrument equipment consists of two integrating wattmeters, a recording ammeter, a recording voltmeter, two speed-recorders, an air pressure recorder, and a portable wind vane and anemometer. One integrating wattmeter was used to measure the total power supplied to the motors, and the other one measured the power supplied to the air compressor motor. The recording ammeter and voltmeter were of the graphic recording type, and gave continuous records of the current supplied to the motors and the voltage across the motor terminals. The speed recorders were of two different types, the first one installed consisting of a recording ammeter of low range connected to a small generator, which was driven from the axle and separately excited from a storage battery carried on the car. The other speed

recorder was the well-known Boyer recorder, which was installed for the purpose of checking the speed record obtained by means of the electric speed recorder. The air pressure recorder was connected with the brake cylinder, and was used in making braking tests as well as serving to show whether or not the brakes were fully released during any tests. The portable anemometer and wind vane were mounted on a tripod and set up in the field adjacent to the track, and were used to determine the direction and velocity of the wind for each individual test. The record sheet or chart was 40 ins. wide, and was arranged to be operated on either a time base or a distance base. In operating on a time base the paper rolls were driven by a small electric motor, while for operation on a distance base the rolls were driven from the axle by means of a system of gears. A record of distance was obtained by means of a magnetically operated pin, which made an offset in the distance line every 50 ft. The magnet circuit was completed by a contact-maker driven from the axle. The location of the car at any instant was obtained by a pen operated by a magnet, the circuit of which was closed by means of a telegraph key operated manually as the car passed the poles. The time record (fig. 5) consisted of two lines operated by magnets, which had their circuits closed every five seconds by a time-marker clock, thus producing offsets in the time lines at five seconds' intervals. In addition to these recording instruments, indicating instruments were also connected in the circuits, and the records were frequently checked with the readings on the indicating instruments. Attempts have been made from time to time to develop an instrument for recording acceleration. The best results have been obtained by using a one-kilowatt transformer having the low tension winding connected in series with the ammeter used for recording speed and the high tension winding connected to a millivoltmeter. The jump spark method of recording was used with partial success, but owing to the pressure of more important work, this accelerometer was never fully developed.

In making the tests the car was operated on the Illinois Traction System's track between Champaign and Danville. This track was of the ordinary interurban construction, the rails 30 ft. long and 70 lbs. to the yard, being supported by sleepers spaced two ft., centre to centre, and the ballast was mostly gravel. A very accurate survey of the track was made and the exact location of each pole determined.

The scheme of operation followed in making the tests was to select a section of track free from grades and curves and of as great a length as possible. Owing to the fact that the kinetic energy of the car at high speeds was relatively large, and reading the speed record to



Interior of Car used in making tests

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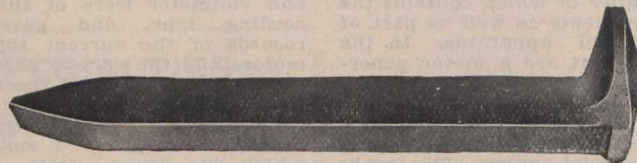
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the second decimal place rather difficult, no sections under 1,000 ft. in length were used, and as this division of the railway system contained a large number of curves, it was impossible to obtain suitable sections much more than 2,000 ft. long. A certain section of track was selected as the scene of operations for a certain day, and the car was run in both directions over this section as many times as possible. The regular service on this division being frequent it was unusual to obtain more than 40 individual tests in any one day, and the number of tests fell on some days to 10 or 12. The car was run to a point about 1,000 ft. from the end of the selected section, and brought up to the required speed some time before entering this section. While making the tests to determine the increase of train resistance due to curves, various curves of different radii, ranging from 1 to 15 degrees, were selected, and accurate surveys made of the curves and sections of tangent track at both ends of the curves. The car was operated at a uniform speed over the section of tangent track before entering the curve, the curve, and the section of tangent track after leaving the curve.

planimeter. The mean height was then obtained by dividing the area by the distance between the perpendiculars, and the mean values of current voltage and speed were read on the calibration curves. The time taken to pass over the section was obtained by measuring the time line from the last five second offsets to the perpendiculars at the ends of the section. Knowing the current, voltage, and time, the energy delivered to the motors were calculated. From the speed record the speeds at the entrance and exit of the section were obtained, and the kinetic energy of these speeds calculated. From the profile the elevations were obtained, and the energy input or output due to grade was calculated. Thus energy delivered to the motors plus or minus the change in kinetic energy plus or minus the energy due to grade divided by the length of the section gave the tractive effort over the section. This divided by the weight of the car in tons gave the true train resistance in pounds per ton, the various values of which were then plotted against speed and an average curve

fully ascertained and made a part of the records.

A total of about 400 tests was made in the determination of train resistance for straight, level track, and the values obtained in these tests were plotted. As is to be expected in work of this nature, all of the points did not lie on a curve, so an average curve was drawn such that the sum of the moments of the points lying on one side of the curve was equal to the sum of the moments of the points on the other side of the curve. In this way a curve was obtained which was held to represent the average values of train resistance for ordinary interurban cars on a track of this type. At the same time the fact that a considerable number of points lay further from the curve than any possible error could account for would indicate that the train resistance varies over a considerable range, and shows the necessity of experiments to determine the values of individual elements of train resistance. The results of the tests to determine the increase of train resistance due to curvature were plotted in a series of curves showing the in-

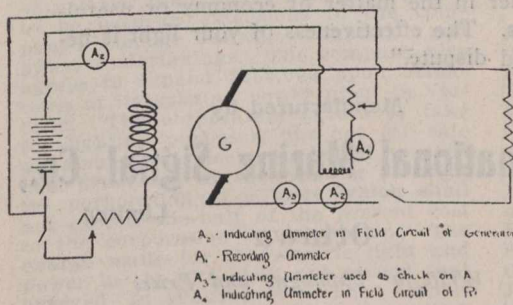


Fig. 3. Speed Recording Apparatus, Electric Test Car.

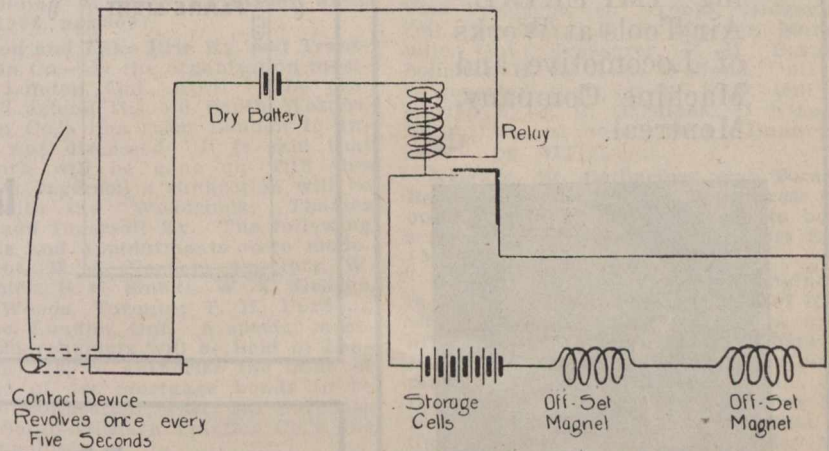


Fig. 5. Schematic Diagram, Time Recording Apparatus Electric Test Car.

The method followed in working up the data recorded on the charts was as follows: At each end of the sections selected a perpendicular to the base lines was drawn across the chart, and, using a templet to correct for the arc described by the recording pens, the exact locations of each of the pens at the times of entering and leaving the sections were obtained. Perpendiculars were then drawn from these points to the various base lines, and the area enclosed by the base line, the record, and the two perpendiculars were obtained by using a

planimeter which showed the value of train resistance for all of the various speeds. In determining the increase of resistance due to curves the same method was followed, except that the tangential section at each end of the curve section was worked up to avoid any possible error due to change in the relative direction of the wind with respect to the car. The superelevations of all curves were care-

fully ascertained and made a part of the records.

crease for curvature of 1, 2, 3, 5, and 10 and 15 degrees. The foregoing paper was read before the Canadian Society of Civil Engineers recently.

Electrical Energy Inspection in B.C.—

An act was passed last session of the British Columbia Legislature providing for the appointment of an officer whose duty it shall be to inspect the premises and plant used for the generation, transmission and supply of electrical energy for power, lighting, heating or other purposes. The powers of the Inspector are extensive, as he is authorized to require the attendance of any person he may desire to examine, and the production of all books, in connection with the plant under inspection, and a penalty of \$50 may be enforced for obstructing the Inspector in the discharge of his duties. The Inspector may make an order directing the remedying of any defects, such order to become operative on confirmation by the Government; and if it is not complied with a penalty of \$50 a day may be enforced until the defects are remedied. The inspectors under the act, it is provided by sec. 17, shall in no wise relieve any company from any liability or responsibility resting upon it by law.

Alberta and Saskatchewan Central Ry.—The Alberta Legislature has incorporated a company with this title to build a railway through the centre of the province east and west, with branch lines, connecting up the principal towns.

The 100,000 tons of steel rails ordered by the C.P.R. from the Algoma Steel Co., as mentioned on page 361, include various orders placed within the last four months.

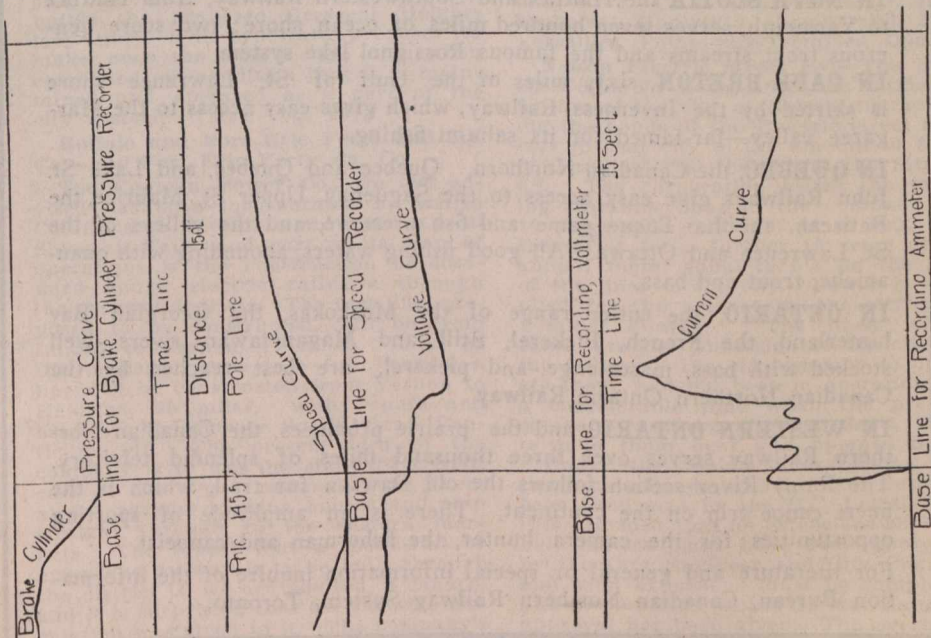
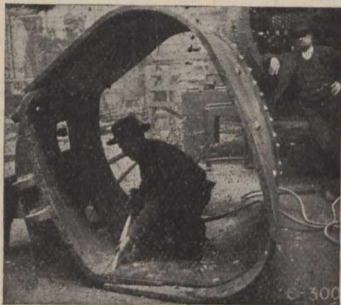


Fig. 4.

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Two Photos, showing "IMPERIAL" Air Tools at Works of Locomotive and Machine Company, Montreal.



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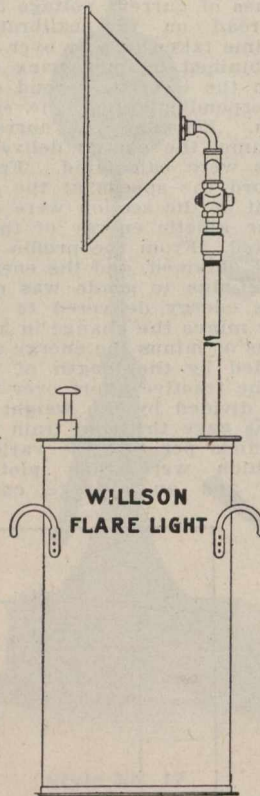
"During the past two or three years we have used various kinds of lights, but none of them have proved the equal of yours, either in the matter of economy or usefulness. The effectiveness of your light is beyond dispute."

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New Ways To The Woods

The six railways of the Canadian Northern Railway system offer the widest choice of new territories for the fisherman, canoeist, camper and hunter.

IN NOVA SCOTIA the Halifax and Southwestern Railway, from Halifax to Yarmouth, serves seven hundred miles of ocean shore; two score generous trout streams and the famous Rossignol lake system.

IN CAPE BRETON, sixty miles of the Gulf of St. Lawrence shore is skirted by the Inverness Railway, which gives easy access to the Margaree valley—far-famed for its salmon fishing.

IN QUEBEC, the Canadian Northern, Quebec and Quebec, and Lake St. John Railways give easy access to the Saguenay, Upper St. Maurice, the Batiscan, the La Tuque game and fish preserve, and the valleys of the St. Lawrence and Ottawa. All good fishing waters, abounding with ouaniche, trout and bass.

IN ONTARIO, the entire range of the Muskokas, the Georgian Bay hinterland, the French, Pickerel, Still and Maganetawan rivers—well stocked with bass, mascalonge, and pickerel, are best reached by the Canadian Northern Ontario Railway.

IN WESTERN ONTARIO and the prairie provinces, the Canadian Northern Railway serves over three thousand miles of splendid territory. The Rainy River section follows the old Dawson fur trail, which is the finest canoe trip on the continent. There is an amplitude of sporting opportunities for the camera hunter, the fisherman and canoeist.

For literature and general or special information inquire of the information Bureau, Canadian Northern Railway System, Toronto.

ELECTRIC RAILWAYS.

Canadian Street Railway Association.

PRESIDENT, D. McDonald, Manager, Montreal St. Ry.; VICE-PRESIDENT, J. Anderson, Manager, Sandwich, Windsor and Amherstburg Ry.; SECRETARY-TREASURER, Acton Burrows, Managing Director, Railway and Marine World.
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EXECUTIVE COMMITTEE.—P. Dubee, Secretary, Montreal St. Ry.; E. A. Evans, Chief Engineer, Quebec Ry. Light and Power Co.; R. J. Fleming, General Manager, Toronto Ry.; H. M. Hopper, Secretary-Treasurer, St. John Ry.; J. E. Hutcheson, Superintendent and Purchasing Agent, Ottawa Electric Ry.; C. B. King, Manager, London St. Ry.
ASSISTANT SECRETARY, Aubrey Acton Burrows, Secretary and Business Manager, Railway and Marine World.
OFFICIAL ORGAN, THE RAILWAY AND MARINE WORLD.

Projects, Construction, Betterments, Etc.

British Columbia Electric Ry.—The British Columbia Legislature has confirmed an agreement made between the company and the city of Victoria. The agreement provides that within three years the company will expend \$1,500,000 in the construction of an electric plant near Victoria, having a capacity of not less than 10,000 h.p., such power to be used in extensions to the company's electric railway, lighting and power undertakings. The company also agrees to expend \$250,000 upon extensions of its existing power plant in Victoria. The corporation agrees to take for lighting purposes, but not for sale an amount of electricity equal to that now generated by the existing plant of the corporation at a price which shall not exceed one-half of the present cost to the corporation of generation. The charge made for the electric light and power in the city shall not exceed that charged in Vancouver. The corporation agrees not to become a competitor of the company in the sale of electric light or power.

A contract is reported to have been let to J. W. Pike, Vancouver, for the completion of the prairie section of the line to Chilliwack, about five miles. The contract was originally let to the Seattle and Puget Sound Dredging Co., but was later on taken over by the company. The section is a difficult one to build owing to the swampy character of the ground. (April, pg. 310).

Calgary, Alta.—An offer has been made to the Calgary, Alta., City Council, by a local syndicate, that it will build under the City Engineer's supervision, a line of 1.5 miles, through a building site owned by it, as soon as the city builds the proposed Crescent Heights loop line. The syndicate proposes to make over the line to the city when completed, on condition that it is maintained and operated as a part of the city system. (Mar., pg. 231).

Buffalo and Fort Erie Ferry and Ry. Co.—See Fort Erie Ferry Ry. Co.

The Couteau Power Co., we are advised has been incorporated in British Columbia to develop some 5,000 h.p. at Shuswap Falls, and part of its plan of operations is the construction of standard gauge electric railways through the orchard districts. The first line, proposed to be constructed, will be from Lumby to Vernon, 17 miles. Later as the orchards come into full bearing a line will be constructed from Vernon to Kelowna, 30 miles, with spurs and branches at Kelowna, Summerland, Penticton, etc. The present idea of the company is to use the standard freight cars of the steam railways, load them at the various packing houses and ship straight through to the eastern markets. The report that a mono-rail or gyroscope railway is to be built through the district is, we are advised, a canard, and it is surprising that such a wide circulation was given to it. The company's

officers did receive a letter from the inventor of the gyroscope plan. (Mar., pg. 231).

The Fort Erie Ferry Ry. Co.'s application for an act increasing its capital stock, and changing its name to the Buffalo and Fort Erie Ferry and Ry. Co., has been passed by the Ontario Legislature.

Frank, Alta.—A project is reported to be under consideration for the construction of an electric railway from Frank, to connect up the mining towns and villages in the Grassy Mountain district. The Canadian-American Coal and Coke Co., is the principal company interested in the development of the district which is estimated to have a population of about 9,000.

Halifax Electric Tramway.—A special committee, appointed by the Halifax, N.S., City Council, is considering the question of double tracking certain portions of the Tramway Co.'s lines, and of securing their extension northerly. The company is desirous of building a second track on certain streets, but the Council before giving permission for the work to be gone on with is anxious to secure the building of some additional lines. (July, 1908, pg. 509).

London and Lake Erie Ry. and Transportation Co.—At the organization meeting in London, Ont., April 7, the proposal to extend the old South Western Traction Co.'s line from London to Ingersoll was discussed. It is said that this work will be gone on with this year. At Ingersoll a connection will be made with the Woodstock, Thames Valley and Ingersoll Ry. The following elections and appointments were made: President, M. A. Verner; directors, W. F. Dinnick, S. C. Smoke, W. K. George, G. B. Woods, Toronto; T. H. Purdom, J. Milne, London, Ont. A special meeting of shareholders will be held in London, May 10, to authorize the issue of \$700,000 of 1st mortgage bonds to be used in connection with the purchase of the South-Western Traction Co.'s line and franchises.

Montreal and Southern Counties Ry.—The Dominion Parliament has extended the time within which the company may complete the building of its authorized lines. (Feb., pg. 147).

Montreal East Boulevard Co.—Application is being made for the incorporation of a company with this title to construct a boulevard from Montreal to the northeast extremity of Montreal Island, and to construct a tramway thereon. The provisional directors are:—M. J. A. Prendergast, J. T. R. Laurendeau, G. Harbruboise, Montreal; Joseph and Jean Versailles, Pointe-aux-Trembles, Que.

Nelson Electric Street Ry.—The British Columbia Legislature has ratified a by-law of the city of Nelson guaranteeing the bonds of the Electric street railway in that city to the amount of \$25,000, and interest thereon at the rate of 6%. The corporation leases the existing tramway lines to the company for 10 years at a rental of \$1 a year, and thereafter for a further 10 years at an annual rental equal to 6% on the cost of the lines to the city. Power is supplied for the present by the city at a nominal charge. The lines, which came into the possession of the city on the failure of the old company to operate them, had not been in operation for a considerable time when the present company was organized in Sept., 1909, to take them over and operate them.

Under the by-law guaranteeing the company's bonds which has recently been confirmed by the B.C. Legislature, it is provided that no extensions shall be built unless plans have been approved by the City Engineer and City Council, and such extensions must be completed and in operation within 12 months after approval has been given. The overhead

or trolley system is to be used entirely, and the company is permitted to use the electric light poles owned by the city, for street railway purposes. The by-law provides for the construction of the following extensions of the present lines:—

Four blocks across Gore St. to Hendry St., down Hendry St., to Mill St., up Mill St. to Park St., down Park St. to Silica St., down Silica St. to Ward St., down Ward St. to the present existing line on Baker St., such lines to be constructed within six months after the by-law becomes operative. The company has authority under the by-law to erect car barns and a power plant. For the present power is supplied by the city at a nominal charge.

A contract has been let to L. G. Brandt for the construction of some new track complete, to be built immediately. The rails, poles and other supplies are on the ground. A new car barn has been completed. (Mar., pg. 231).

Niagara Falls, Welland and Dunnville Electric Ry.—At the organization meeting recently held the following were elected officers for the current year:—President, F. R. Lalor, Dunnville, Ont.; Vice President, G. Arnold, Ridgeville, Ont.; Secretary, F. E. Misener, Marshville, Ont.; Treasurer, P. H. Burger; Solicitor, H. A. Rose, Welland, Ont. It is reported that survey work will be started by J. C. Gardiner, of Niagara Falls, Ont., at once, from Dunnville. (April, pg. 311).

Niagara, St. Catharines and Toronto Ry.—A Niagara Falls, Ont., press report states that it is proposed to build a line during the summer to Fort Erie. (Mar., pg. 231).

Nipissing Central Ry.—The engineering inspector of the Department of Railways, April 12, approved of the operation of cars over the line between Haileybury and Cobalt, Ont., at a maximum speed of 15 miles an hour. At that time about a mile of ballasting had to be completed. It is expected that the line will be opened for traffic May 1.

An extension of 1.5 miles to Port Cobalt will it is said be constructed immediately, and the proposed extension to New Liskeard, will be gone on with as soon as the financial arrangements have been concluded. (April, pg. 311).

Ontario West Shore Ry.—It is reported that grading has been completed on about 25 miles between Goderich and Kincardine, Ont. Rails are lying at Goderich, and tracklaying will it is said be started at an early date. It is expected that the line will be ready for operation by the end of the summer. Power is to be obtained from the Maitland River Power Co., which is developing 15,000 h.p. from a head of 105 ft. (Nov., 1909, pg. 848).

Ottawa Electric Ry.—A meeting between officers of the company and the civic street railway extension committee was held April 13, when the various routes proposed for extensions to the south, and also to the cemeteries were considered. A report will be presented to the city council. (Mar., pg. 233).

Peoples Ry.—A by-law was passed at Berlin, Ont., Mar. 31, favoring the taking of \$60,000 of stock in this company, on condition that the projected line be extended from New Hamburg through Berlin to Guelph. It has been decided by the Wilmot tp. council to submit to vote a by-law to take \$30,000 stock in the company to aid in the construction of an electric railway through the municipality. (Mar., pg. 233).

Port Arthur-Fort William St. Ry.—The Joint Street Ry. Board is considering the advisability of laying 80 lb. rails all over the lines in Port Arthur, Ont., and of carrying out a number of improvements on the other lines. (April, pg. 311).

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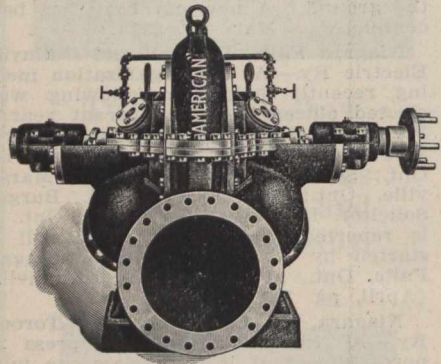
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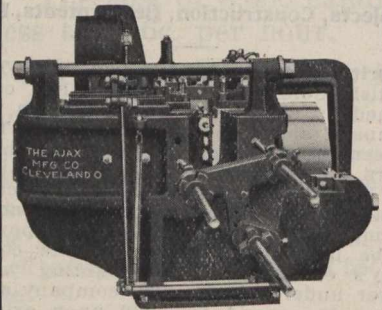
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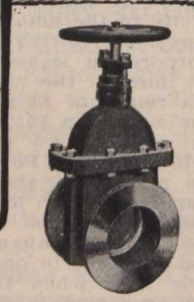
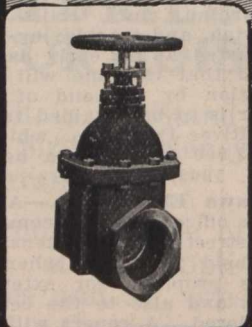
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38 Wellington St., E. TORONTO.

Quebec Ry., Light and Power Co.—A by-law has been passed increasing the directors from three to 15.

Quebec Ry., Light, Heat and Power Co.—It is reported to have been decided to erect an eight story building for station and office purposes on the site of one of the Jacques Cartier market halls recently purchased by the company.

The directors at a meeting held April 11, decided to proceed with the building of a double track extension of six miles from Maple Ave., to Quebec Bridge site, and a double track from the Montmorency Falls to Ste. Anne de Beaupre. Some extensions are to be made at the Kent House, and park during the summer.

There has been deposited in the Registry office at Quebec plans of the proposed extension of the line to St. Colomb de Sillery, for which the approval of the Board of Railway Commissioners is to be asked. (Dec., 1909, pg. 931).

Regina, Sask.—A press report states that the City Council has granted a 20 year franchise for the building and operation of an electric railway in the city to J. W. D. O'Grady, J. A. Anderson and J. Geddes of Winnipeg. The agreement provides that the city can take over the lines on the expiration of the franchise. (April, pg. 311).

The St. George Electric Co. is applying to change its name to the Bearice Electric and Power Co., with power to construct an electric tramway from St. George station, on the Quebec Central Ry., through St. George and the Valley of La Riviere du Loup, to the International boundary between Quebec and Maine. Campbell and Gendron, Sherbrooke, Que., are solicitors for applicants.

St. Thomas St. Ry.—The city council is preparing to give the ratepayers another opportunity of passing a by-law (the one submitted in Jan. being defeated) authorizing the raising of money to put the municipal street railway in proper condition. The City Engineer reported to the Council April 1, that unless the line was improved very soon its operation would have to be suspended. (Jan., pg. 59).

Sherbrooke Ry. and Power Co.—A franchise for 28 years has been granted to the company, a condition being that \$500,000 will be spent upon improvements and extensions at once. C. J. McCuaig, Montreal, is President of the new company, which has taken over the nine year old line of the Sherbrooke St. Ry. Co. He, with others interested, was in the city April 4, and in an interview said the work of reconstruction and extension will be carried out under the direction of Ross and Holgate, Consulting Engineers, Montreal. The company proposes to develop a water power on the Magog River and to supply power for manufacturing purposes. C. B. Hibbard is Vice President and General Manager. (See Sherbrooke St. Ry., Mar., pg. 233).

Simcoe Ry. and Power Co.—An extension of time for the construction of this company's projected electric railway near Midland, Ont., was granted at the last session of the Ontario Legislature. The act also contains a section confirming by-laws passed by the County of Simcoe, and the townships of Ting and Matchedash, granting right of way for a pole transmission line. (Feb., pg. 147.)

Suburban Tramway and Power Co.—Application is being made for an act authorizing the company to change its name; to exercise throughout Montreal Island and Soulanges and Terribonne counties all the rights and privileges conferred upon it by law; to construct underground railways and terminal stations, and to put the company under the control of the Quebec Public Utilities' Commission in respect of such powers.

The company is a subsidiary of the Montreal Street Ry. Co.

Toronto and York Radial Ry.—A press report states that the company has under consideration plans for the extension of its Scarborough division northerly from the Kingston Road to Markham, Ont. The company has purchased about 92 acres of land south of the Kingston Road, 6½ miles from the Woodbine, for use as a picnic park; a line will be run into the park. (April, pg. 311).

Toronto Ry.—The City Engineer, April 15, received a letter from the General Manager Toronto Ry., stating that it had been decided to lay a double line of tracks on five new routes, and single tracks on two other new routes. Girder rails are to be laid on the down-town streets, and 70 lb. T rails on the other streets.

The City Engineer reported to the Works Committee as to certain routes upon which the Council should request the company to extend its lines. (April, pg. 311).

Toronto Tube Railways.—The committee of the Toronto City Council having in charge the proposals for the construction of a system of tube railways in the city, recommends the appointment of a special legal adviser, and an engineer.

Sandwich, Windsor & Amherstburg Ry.

This company does not issue a separate report, its operations being included with those of the Detroit United Ry., of which system it is a part. The following particulars of the S.W. & A. Ry. are extracted from the D.U.R. report for the year 1909. Mileage on Jan. 1, 1909, 35,813 miles, to which .247 miles were added during the year. Interest on funded and floating debt and taxes, \$26,803.57. Revenue passengers, 3,018,413; transfer passengers, 356,665; employe passengers 20,920; total, 3,395,998. Receipts revenue passengers, .0541; receipts per passenger, .0480. Car mileage, 854,641; earnings car mile, .1991; expenses car mile, .1078; net earnings car mile, .0913. An extension of lighting plants and addition to power house was built at a cost of \$26,644.34. In the D.U.R. assets the S.W. & A.R. is included as an investment at \$253,134.91, and under accounts current at \$193,075.92.

BALANCE SHEET, S.W. & A. RY.

Capital stock	\$ 297,000.00	
Mortgage bonds	490,000.00	
Accrued interest on bonds	4,987.50	
Detroit United Railway	193,075.92	
Vouchers Payable	1,698.17	
Injuries and damages Reserve	906.88	
Insurance reserve	737.86	
Unredeemed tickets	2,841.84	
Profit and loss	18,096.56	
Investment	\$ 944,943.98	
W. & T.E. Ry. Co. (stock)	10,000.00	
W. & T.E. Ry. Co. Accounts receivable	5,115.84	
Stores	876.61	
Cash	906.62	
	47,501.68	
	\$1,009,344.73	\$1,009,344.73

BALANCE SHEET, WINDSOR & TECUMSEH ELECTRIC RY. CO.

Capital stock	\$ 100,000.00	
Mortgage bonds	189,000.00	
Sandwich, Windsor & Amherstburg Ry.	5,115.84	
Investment	\$ 294,115.84	
	\$ 294,115.84	\$294,115.84

The earnings and expenses of the Windsor & Tecumseh Electric Ry. are included in the operations of the S.W. & A.R., which latter company owns all of the capital stock of the W. & T.E.R. Co.

Electric Ry., Finance, Meetings, Etc.

British Columbia Electric Ry.—Gross earnings for Feb., \$237,756; working expenses \$139,884; net operating earnings \$97,872; renewal funds \$17,852; net earnings \$80,020; approximate income from investments \$16,500; net income \$96,520, against \$181,638 gross earnings; \$99,969 working expenses; \$81,669 net operating earnings; \$13,968 renewal funds; \$67,711 net earnings; \$13,550 approximate income from investments; \$81,261 net income for Feb., 1909. Aggregate gross earnings for eight months ended Feb. 28, \$1,968,901; net earnings, \$861,148, against \$1,525,557 gross and \$711,266 net for same period 1908-09.

Calgary St. Ry.—Gross earnings for Mar., \$13,257.65; maintenance of way and structures \$388.31; maintenance of equipment \$903.98; transportation expenses \$6,097.06; general expenses \$473.27; total expenses \$7,862.62; net earnings \$5,395.03. Gross earnings, per car mile, 25.424; expenses, per car mile, 15.878; net earnings per car mile, 9.546.

Halifax Electric Tramway.—Railway receipts for Mar., \$15,966.97, and for two weeks ended Apr. 14, \$7,303.94, against \$13,558.21 and \$6,686.16 for same period 1909.

London St. Ry.—Gross earnings for Mar., \$20,451.80; expenses \$14,762.17; net earnings, \$5,689.63; deductions, \$2,441.75; net income, \$3,247.88, against \$18,080.01 gross earnings; \$13,411.91 expenses; \$4,668.10 net earnings for Mar., 1909. Aggregate gross earnings for three months ended Mar. 31, \$56,164.74; expenses, \$41,467.30; net earnings, \$14,697.44; deductions, \$7,089.05; net income, \$7,608.39, against \$52,314.84 aggregate gross earnings, \$39,121.40 expenses \$13,193.44 net earnings for same period 1909.

Montreal St. Ry.—Passenger earnings for Mar., \$332,781.05; miscellaneous earnings \$3,415.54; total earnings \$336,196.59; operating expenses \$220,790.08; net earnings \$115,406.51; city percentage on earnings \$23,877.32; interest on bonds and loans \$14,637.64; rent leased lines \$552.90; taxes \$4,000; total charges \$43,067.86; surplus \$72,338.65; expenses per cent. of earnings 65.67, against \$295,979.61 passenger earnings; \$2,748.26 miscellaneous earnings; \$298,727.87 total earnings; \$203,832.08 operating expenses; \$94,895.79 net earnings; \$20,540.26 city percentage on earnings; \$14,861.91 interest on bonds and loans; \$498.67 rent leased lines; \$3,000 taxes; \$38,900.84 total charges; \$55,994.95 surplus; 68.23 expenses per cent. of earnings, for Mar., 1909. Aggregate total earnings for six months ended Mar. 31, \$1,992,236.21; operating expenses \$1,216,984.37; net earnings \$775,251.84; total charges \$214,978.43; surplus \$560,273.41; expenses per cent. of earnings 61.09, against \$1,813,342.55 aggregate total earnings; \$1,149,583.72 operating expenses; \$663,758.83 net earnings; \$198,042.58 total charges; \$465,716.25 surplus; 63.40 expenses per cent. of earnings for same period 1908-09.

Port Arthur-Fort William St. Ry.—Receipts for March, \$8,461, making for the three months ended Mar. 31, \$22,199. Operating expenses for Jan., \$5,399.45; for Feb., \$4,747.98.

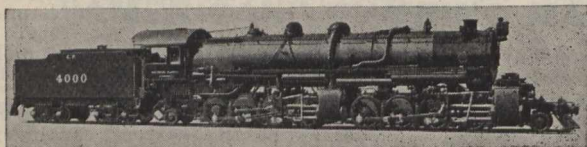
Quebec Ry. Light and Power Co.—A dividend at the rate of 7% per annum for the half year ended April 30, will be paid May 2.

Winnipeg Electric Ry.—Gross earnings for Feb., \$261,800; expenses \$133,300; net earnings \$128,500, against \$202,300 gross earnings; \$101,800 expenses; \$100,500 net earnings for Feb., 1909. Aggregate gross earnings for two months ended Feb. 28, \$559,400; net earnings, \$274,900, against \$434,800 gross and \$217,000 net for same period 1909.

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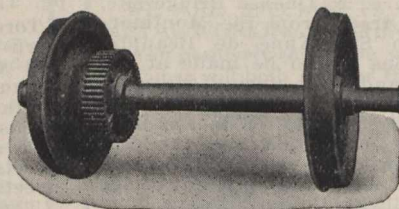
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Map No. 1—Winnipeg to Second Meridian.....	\$ 8.00 to \$15.00 per acre.
Map No. 2—South-Eastern Saskatchewan, 2nd to 3rd Meridians.....	10.00 to 25.00 per acre.
Map No. 3—Main Line, 3rd and 4th Meridians (generally).....	8.00 to 10.00 per acre.
Map No. 4—Part of Western Saskatchewan, 3rd to 4th Meridians.....	10.00 to 25.00 per acre.
Map No. 5 South-Western Alberta.....	8.00 to 25.00 per acre.

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160 Acres at \$ 8.00 per acre, cash payment	\$191.70	first year's interest	\$ 65.28	and nine instalments of	\$160.00
" " 9.00 " " " "	215.70	" " " "	73.46	" " " "	180.00
" " 10.00 " " " "	239.70	" " " "	81.62	" " " "	200.00
" " 11.00 " " " "	263.60	" " " "	89.78	" " " "	220.00
" " 12.00 " " " "	287.60	" " " "	97.96	" " " "	240.00
" " 13.00 " " " "	311.55	" " " "	106.10	" " " "	260.00
" " 14.00 " " " "	335.60	" " " "	114.32	" " " "	280.00
" " 15.00 " " " "	359.50	" " " "	122.44	" " " "	300.00

Purchasers who do not undertake to go into residence on the land are required to pay one-sixth of the purchase money down, balance in five equal annual instalments with interest at the rate of six per cent. per annum. Interest at six per cent. will be charged on overdue instalments.

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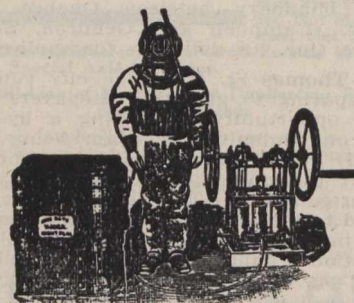
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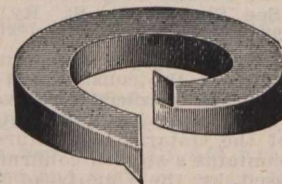
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Electric Railway Notes.

The Montreal St. Ry., has received two summer cars from the Preston Car and Coach Co., Preston, Ont.

City Engineer Bell has been appointed Manager, and L. D. Gillett, Superintendent of the municipal electric street railway at St. Thomas, Ont.

Three actions have been entered against the British Columbia Electric Ry., for damages in connection with the accident at Lakeview last Nov., when 14 were killed.

The Nipissing Central Ry., has received two fully equipped cars from the Preston Car and Coach Co., Preston, Ont., exactly similar to those delivered in Feb., and described in our Mar. issue.

The Toronto Ry., is reported to be contemplating a scheme for the use of creosote blocks under rails instead of concrete as at present, with a view to lessening noise.

It was reported to the Montreal City Council, April 12, that the Montreal St. Ry. was hauling C.P.R. freight cars over certain of its tracks at night. It was decided to investigate the report.

A map showing the electric lines in Toronto on a very large scale is being prepared for the Ontario Railway and Municipal Board, by K. L. Aiken, Electrical Engineer to the city council.

The London St. Ry. has granted an increase of pay to its employees, which works out to an additional 10c. a day, with a 9½ hour instead of a 10 hour day.

The Hull Electric Co., has received from the Preston Car and Coach Co., Preston, Ont., three cars, 38 ft. over body, 5 ft. 2 ins. length of vestibule, 49 ft. 4 ins. length overall, equipped with S.M.E. Westinghouse air brakes.

The Quebec Public Utilities Commission held its first meeting, April 5, to consider rules of procedure. It has been decided to meet for the transaction of business on the first Tuesday in each month.

W. H. Elson, who has been in the C.P.R. employ for about 23 years, as conductor and trainmaster, has been appointed Trainmaster British Columbia Electric Ry., in charge of all matters connected with the rolling stock on the New Westminster, Lulu Island and North Arm interurban lines. This is a

There has been discovered in a vault in a lawyer's office in Windsor, Ont., an agreement between the town of Sandwich, Ont., and the Sandwich, Windsor and Amherstburg Ry., granting the company a perpetual franchise. This agreement has been missing for some time.

The Brantford St. Ry. has adopted a new system of collecting fares and registering the number of passengers on its cars. The passenger puts the amount of fare into a slot machine (weight, 20 oz.) carried by the conductor, in which it is registered. No money for fares is handled by the conductor until after it is registered. Tickets are dealt with in the ordinary way.

The B.C. Electric Ry. is building at its own car shops 22 city passenger cars and four box cars, during the year purposes constructing there, in addition to the foregoing:—12 city passenger cars, six suburban passenger cars, two line cars, one express car, three box cars and three cabooses, and orders will be placed for 75 flat cars, one locomotive for shunting purposes and two electric locomotives. The estimated cost of this additional equipment is \$435,000.

For the second time within two years the Montreal St. Ry. Co. has announced a voluntary increase in the scale of wages of motormen and conductors. The

motormen and conductors receive the same pay, but are divided into three classes. Those of one and two years' standing will now receive 19c. an hour instead of 18c. Those of from two to five years' standing will receive 20c. instead of 19c., and those of more than five years' standing will receive 21c. an hour.

The Nova Scotia Legislature is considering a bill amending the act passed in 1909 appointing a Board of Public Utility Commissioners. It is proposed to add two new sections, the first providing that no public utility shall place wires "upon, along, under or across" any street in a city or town without first obtaining the consent of the council; and the second, that no similar work shall be done in any municipality other than a city or town, unless one month's notice shall have been given to the Warden and the councillors, who can make an agreement. In either case, the Public Utilities Commission can approve in the event of a disagreement.

Telegraph and Cable Matters.

The twenty-ninth annual meeting of the Association of Railway Telegraph Superintendents, is announced to be held at Los Angeles, Cal., May 16 to 20.

The recent trouble between the Winnipeg Grain Exchange and the telegraph companies operating there has been got over, and ample space has been allotted to the C.P.R., Canadian Northern and G.N.W. Telegraph Cos., in the Exchange for handling the business.

A wireless telegraph installation has been placed on board a tug at Port Arthur, so that communication can be made with all vessels on the lakes similarly equipped. This is a temporary arrangement to serve until the erection of a Government station at the port.

The bills to control ocean cable rates and to amend the Telegraph Act, were dealt with in the Senate, Apr. 15, and, on the second reading, Sir Richard Cartwright stated that persons interested had asked to be heard and the usual practice would therefore be departed from, and the bills sent to the Railway Committee.

Press reports state that the C.P.R. commercial telegraph operators in the west have appointed a committee to deal with the question of increases of pay. It is stated that they are asking that the maximum wage be increased from \$90 to \$110 a month. C.P.R. operators on the Ontario Division are also reported to have asked for an increase of 10% over the present schedule.

The C.P.R., and G.N.W. Telegraph companies inaugurated a night lettergram service Apr. 13, the charge for 50 words or less, being at the regular day rate for 10 words, and one-fifth of that rate will be charged for each additional 10 words, or part thereof. These rates apply to all points reached by the companies' lines, and also to connecting offices in the U.S.

The Marconi wireless telegraph station at Glace Bay, N.S., which was burned last year, has been reconstructed, and was opened for business Apr. 20. Offices have been opened at Montreal, where a system will be exhibited showing the positions of the various Atlantic liners, which are equipped with Marconi apparatus. The rate for trans-Atlantic messages has been fixed at 12c. a word.

On the passing of the bill in the House of Commons, to control the rates and facilities of ocean cable companies, and to bring them under the jurisdiction of the Board of Railway Commissioners, the Postmaster General recently stated that concurrent legislation would be passed in the British Par-

liament to make the law operative. On Apr. 12, the British Postmaster General stated in the House of Commons, in reply to questions, that he was unable, at present, to make a statement regarding the course the British Government would take.

Among the Express Companies.

It is not anticipated that the Board of Railway Commissioners' judgment in connection with the enquiry into express rates, will be delivered before about the middle of May.

The Dominion Ex. Co. is erecting a transfer building at Galt, Ont., for handling express matter between the C.P.R., and the Galt, Preston and Hespeler St. Ry. It will be of red pressed brick, and its dimensions, 20 by 40 ft.

H. J. Parr, Travelling Auditor Canadian Ex. Co., met with a rather peculiar accident recently. A loaded revolver was being returned to one of the safes in the St. John office, when it was dropped and discharged, the bullet entering his left leg. The wound, though painful, is not serious.

The Board of Railway Commissioners, which commenced an enquiry into the rates of express companies operating in Canada, Apr. 6, has approved a draft form of contract, whereby the companies' liability for loss or damage, is limited to \$50. Provision for greater liability in special cases is also made, when higher rates are charged. The amount of the liability is to be placed in red at the top of each receipt, and is to remain at that figure unless otherwise stated.

The Canadian Expressmen's Mutual Benefit Association's accounts for 1909 show receipts of \$5,148.77, including \$2,364.95 brought forward from 1908, and disbursements of \$1,679.51, leaving a balance of \$3,469.26 to be carried forward to the current year's accounts. The Death Benefit Fund has been taken over and a balance of \$76.75 transferred to the above, making the amount carried forward \$3,546.01. The officers for the current year are:—Hon. President, J. Bryce; President, E. Allan; Vice President, B. S. Murray; Secretary-Treasurer, W. T. Murphy, Toronto.

The express companies in dealing with the question of rates on corrugated paper boxes, shipping cases and crated paper boxes, used especially by millinery manufacturers, propose, in view of the light weight of parcels, as compared with their size, that all cases, exceeding total height, length and width combined, of 50 ins., should be accepted only at minimum rates, and that the maximum measurement of such cases should be 110 ins. For cases measuring over 50 ins., and under 60 ins., the minimum weight proposed as a basis is 30 lbs., and a corresponding scale is proposed for larger packages.

Tramway Inspection in British Columbia.—By an act passed last session of the British Columbia Legislature, the Lieut.-Governor in council is authorized to appoint an officer whose duty it shall be from time to time, to inspect all tramways constructed, in course of construction, or that may hereafter be constructed within the province; and to make rules and regulations for enforcing the provisions of the act, especially for regulating the speed at which cars may run, and providing penalties for infractions of the rules. All the provisions of sections 51 to 76, both inclusive (sections 52 to 56, both inclusive excepted) of the B. C. Railway Act are to apply to tramways, and to the inspectors and inspections thereof, the word "tramway" being substituted for "railway," and "Attorney General" for "Chief Commissioner of Lands and Works." Tramway is interpreted as including street railway.

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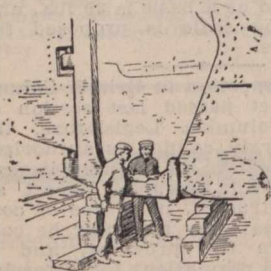
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Great Lakes and St. Lawrence River Rate Committee.

CHAIRMAN, E. E. Horsey, Kingston, Ont. SECRETARY, Jas. Morrison, Montreal.

International Water Lines Passenger Association.

PRESIDENT, W. M. Lowrie, New York. SECRETARY, M. K. Nelson, New York.

The Shipping Federation of Canada.

PRESIDENT, A. A. Allan, Montreal; MANAGER, AND SECRETARY, T. Robb, 526 Board of Trade, Montreal.

Ship Masters' Association of Canada.

GRAND MASTER, Capt. J. H. McMaugh, Toronto, Ont.; GRAND SECRETARY-TREASURER, Capt. H. O. Jackson, 376 Huron St., Toronto.

The Merchants Mutual Line Limited.

The Merchants Mutual Line, Ltd., has been incorporated under the Dominion Companies Act, with a capital of \$750,000 and office at Toronto, to own and operate steam and other vessels, wharves, docks, elevators, etc., and to carry on a general shipbuilding, elevator, navigation and transportation business; to enter into any arrangement for sharing of profits, union of interests or co-operation with any company which it may consider of benefit, and for other purposes. The provisional directors are J. S. Lovell, W. Bain, R. Gowans, H. Chambers and R. M. Coates, Toronto. Mackenzie, Mann & Co., are the controlling interest in this new company.

The Merchants Mutual Line, Ltd., has taken over the steamships Plummer, Pellett and Ames from the Canadian Lake and Ocean Navigation Co., and has bought the Beaverton and Mapleton from the Merchants Steamship Co., and the Saskatchewan from the Colonial Transportation Co. The Saskatoon was described in our March issue, the order for her having been placed in Scotland by J. W. Norcross and R. M. Wolvin. All these six vessels will be run in the Merchants Mutual Line, which must not be confounded with the Merchants Mutual Line, Ltd., the former being simply a line and the latter an owning company. The steamships Acadian and Canadian, owned by the Merchants Mutual Steamship Co. will also continue in the Merchants Mutual Line.

The steamships Turret Court, Turret Cape, Turret Chief and Scottish Hero remain under the Canadian Lake and Ocean Navigation Co.'s ownership.

J. W. Norcross, Toronto, has been appointed General Manager Merchants Mutual Line, Ltd., and he will probably also manage the Canadian Lake and Ocean Navigation Co., which is also controlled by Mackenzie, Mann & Co. interests. J. W. Norcross & Co., are the General Western Agents of the Merchants Mutual Line.

Inland Marine Insurance.

F. King, Counsel Dominion Marine Association, in a recent interview dealt with the work of the advisory committee of the Great Lakes Protective Association. It appears to be a foregone conclusion he stated, that an addition of 1% will be made this year to the rate of 5% now in force on the lakes above Lake Ontario, and the fact that it is also practically decided by underwriters to restrict the sailing dates to Nov. 30, indicates that recent heavy losses in the last days of the season are responsible

for the increased charge. A proposition has now been made that the vessel which makes no claim for damages under her policy should be entitled to a refund of this extra premium.

Prominent underwriters are interested in favor of the proposal, on one condition—namely that a substantial proportion, say 25%, of the refund should go to the master or executive officers of the ship by way of bonus, thus not only rewarding those directly responsible for the safety of the vessel, but also affording a positive incentive to all masters to navigate with caution, and so decrease the risk of loss on all boats, even in cases where the bonus is not actually earned. The underwriters apparently refuse to trust individual owners to administer the bonus properly, and feel that this stipulation should be part of a general scheme.

Mr. King says that while the Protective Association will continue to protest against any extra premium, it will, if forced to submit to the increase, support the above proposition, on a counter condition that while 75% of the refund shall go to the owner, the 25% shall be administered by the committee of the Protective Association subject to certain settled



C. H. NICHOLSON, Manager G.T.P.R. Pacific Coast Steamship Lines.

rules; for, granting that the underwriters are correct in requiring a disinterested trustee for this 25%, cases will frequently arise where a master whose vessel has not had any claims under her policy will still have been grossly negligent and possibly responsible for a considerable number of minor troubles less than the amount of the deductible average, the amount of loss which the owner himself bears in all cases. It is proposed that funds not used for bonuses be devoted towards navigation.

The Insurance Institute, which will meet at a very early date in London, Eng., will be largely guided by representations from New York, and the Protective Association is negotiating with underwriters in New York hoping to have matters settled without delay. Mr. King states that all his colleagues on the committee are in favor of the bonus principle and that the results of a similar system in force in the big Pittsburg Steamship Co., show conclusively that a plausible theory has in that case worked well in practice.

In addition to the 5% mentioned, vessels which trade down Lake Ontario pay 1% more and trading all the way to

Montreal pay still another premium of 1% additional. The rate this year from Montreal would thus be 8%. A strong effort is being made to have these two additional premiums on lower waters reduced at least one-half, and the proposed reduction is being considered in connection with the present revision. Vessel owners complain that losses on the lower waters do not by any means justify the present additional premiums. Data of the Protective Association to the present time support this contention.

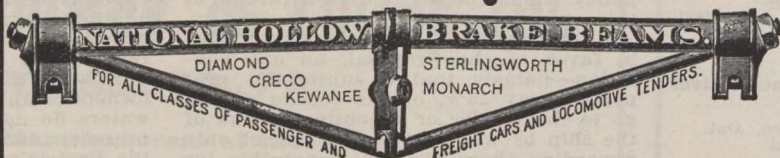
Coast, Lake and River Officers for 1910.

The following appointments have been made by the principal navigation companies for their various steam vessels and tugs for the current year, in addition to those given in our last issue. In the first column is given the name of the vessel, in the second that of the captain, and in the third that of the chief engineer:—

ARROW LAKE LUMBER CO., LTD.,	ARROWHEAD, B.C.	
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Kipple	J. Wilson
BUTLER FREIGHTING AND TOWING CO., LTD.,	VICTORIA, B.C.	
Grainer	D. J. Butler	J. Donaldson
CANADIAN FISHING CO., LTD.,	VANCOUVER, B.C.	
Celestial	F. Brown	J. Dick
Empire
Flamingo	A. Freeman	W. Britton
COLLINGWOOD SHIPPING CO., LTD.,	COLLINGWOOD, ONT.	
Wasaga	M. McCormick	J. E. Readman
FOLEY, WELCH AND STEWART, PRINCE RUPERT, B.C.		
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Omineca	J. Shannon	J. Physick
Operator	C. Meyers	J. Ritchie
Skeena	G. Magar	A. H. Evans
FRENCH RIVER AND NIPISSING NAVIGATION CO.,	STURGEON FALLS, ONT.	
Elgin L. Lewis	L. Johnston	J. Kelso
Highland Belle	J. A. Clark	E. Clark
Northern Belle	A. McKenny	J. Coventry
INLAND NAVIGATION CO., LTD.,	HAMILTON, ONT.	
Donnocona	J. W. Mawdesley	G. E. Downs
Dundee	J. Woolner	G. Fryar
Dundurn	R. Cooney	J. Morris
Dunelm	C. R. Albinson	J. A. Nicol
Glenellah	G. Mackey	A. E. D. Mackay
Neepawah	W. W. Allan	J. Dee
Rosedale	R. Alexander	J. C. Carr
Stadacona	J. Canally	C. H. Menmuir
Strathcona	J. Dick	S. Jones
Wahcondah	W. Linton	W. Leveson
Winona	B. Garvie	J. A. McLaughlin
NORTHERN TRANSPORTATION CO., LTD.,	ATHABASCA	
	LANDING, ALTA.	
Northland Light	C. D. A. Barber	A. V. Bucknam
Northland Sun	G. Nicklas	L. R. Morton
NORTHWEST NAVIGATION CO., LTD.,	SELKIRK, MAN.	
City of Selkirk	J. Sigurdur	J. Keiller
Idell	W. Crawford	S. Stuart
Rocket	R. Forrest	J. Skinner
PELEE AND LAKE ERIE NAVIGATION CO., LTD.,	PELEE ISLAND, ONT.	
Alfred Clark	D. McCormick	W. Lowery
QUINTE NAVIGATION CO., LTD.,	PICTON, ONT.	
Aletha	M. Palmatier	J. Toppins
Brockville	D. B. Christie	J. McFaul
Varuna	J. E. Rathbun	J. Walker
	S. C. SMITH, PENTICTON, B.C.	
Orillia	A. W. McCulloch	L. Smith
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Aurelia	F. Kingston	A. Houghteling
Minitaga	F. A. Cook	U. Hamlin
Mohawk Queen	G. Houston
Nellie Reid	J. Dixon	C. A. McWilliam
Robt. G. Weddell	N. Miron	G. Joppings
Trent	W. Smith	A. Weddell
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Dauntless	J. A. Keenan	H. Bevis
Faultless	W. Somerville	E. Read
Peerless	W. A. Ballagh	F. Somerville
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Notices to Mariners.

The Department of Marine has issued the following:—

- 23. Mar. 18. 49.—Nova Scotia, south coast, Liverpool, range light established on bridge. 50.—Nova Scotia, Cnaso harbor, Arichat, lights to be improved.
- 24. Mar. 18. 51.—Quebec, Ottawa River, Ste. Anne lock range, color of daymarks. 52.—Ontario, River St. Lawrence, gas buoy to be established southward of Renshaw island. 53.—Ontario, River St. Lawrence, gas buoy to be established at shoal below Gleggarry point. 54.—Ontario, River St. Lawrence, Colquhoun island, gas buoy withdrawn. 55.—Ontario, Lake Erie, Port Maitland, Port Burwell, lights improved.
- 25. Mar. 18. 56.—Quebec, Gulf of St. Lawrence, Magdalen islands, Sandy Hook channel, color of buoy. 57.—Quebec, River St. Lawrence, Bersimis River, range lights discontinued. 58.—Quebec, Saguenay River, Chicoutimi, character of light. 59.—Quebec, River St. Lawrence, ship channel between Quebec and Montreal, Montreal harbor, character of Bellerive park and Hochelaga range lights.
- 26. Mar. 29. 60.—Canada, Arctic waters, Hudson Strait, and Melville Sound, hydrographic notes.
- 27. Apr. 4. 61.—Ontario, Lake Huron, Goderich, gas buoy withdrawn. 62.—Ontario, River St. Mary, Sault Ste. Marie Canal, lower entrance, boat light no longer maintained. 63.—Ontario, Rosseau Lake, Ditchburn shoal, light improved.
- 28. Apr. 6. 64.—Nova Scotia, Bay of Fundy, Minas basin entrance, Cape Sharp, change in character of light. 65.—Prince Edward Island, south coast, Northumberland Strait, Hillsborough Bay, Charlottetown harbor, Blockhouse point, hand fog horn at light station. 66.—Prince Edward Island, south coast, Bedeque harbor, Indian point, hand fog horn at light station. 67.—Newfoundland, south-east coast, Cape Race, old tower removed. 68.—Newfoundland, Labrador, Belle Isle, north end, fog alarm, direction in which horn points.
- 29. Apr. 6. 69.—British Columbia, Kootenay Lake, Lardo, light established. 70.—British Columbia, Malaspina Inlet, Theodosia Arm, hydrographic information. 71.—British Columbia, Grenville

channel, Lowe Inlet, position of day beacon.

30. Apr. 8. 72.—Quebec, Gulf of St. Lawrence, Gaspe coast, Grand River, character of light on wharf. 73.—Quebec, River St. Lawrence, ship channel between Quebec and Montreal, St. Antoine range lights, arcs of invisibility. 74.—Quebec, River St. Lawrence, ship channel between Quebec and Montreal, Lake St. Peter, Pointe du Lac range, new front range light house.

Montreal Harbor Improvements.

Resolutions have been passed by the Dominion Parliament authorizing the Government to advance from time to time to the Montreal Harbor Commissioners, such sums not exceeding in the whole \$6,000,000, as may be necessary to pay off debentures amounting to \$100,000 maturing during the current year; to enable the Commissioners to complete the construction of terminal facilities for the port for which plans have been approved; and such other facilities as may be necessary to properly equip the port. The principal and interest of these advances are to be repaid out of the Commission's revenues. The Commissioners propose to add to the wharf accommodations, to deepen the harbor adjacent to the wharves, to lessen St. Mary's current by dredging, to construct sheds on the wharves, to extend the present harbor system of railway tracks, to provide proper unloading facilities, and improved methods of handling cargoes. The plans for all these works had not been prepared, but the works were in line with a very comprehensive scheme which the Commissioners had adopted after having made a very careful examination of harbor improvements and terminal facilities in England, the continent of Europe and the U.S. The amount of the outstanding debentures of the Commission is \$13,142,000, of which \$1,972,000 is due to the public; and the Government loans, represented by debentures deposited by way of security amount to \$11,170,000, to which this \$6,000,000 will now be added.

The plans of the proposed improvements were submitted to the representatives of the ocean and inland marine interests, and to the municipal authorities. The chief features of the plans include wharf and pier extension, basin

development, the construction of a 2,000,000 bush. elevator, elevation of wharf tracks, floating drydock with a capacity to carry the largest ship entering the St. Lawrence and a complete ship-repairing plant; five new modern steel sheds; elevated tracks from the Jacques Cartier pier to the Racine River, about 22 miles, with connections to the wharves and railways; a new and enlarged Victoria pier; a new pier extending from opposite the offices of the Harbor Commission; 74 acres of new quays; extensions of about 300 ft. to each of the three quays above Victoria pier; an addition to the Bickerdike pier; deepening of the channel on the far side of St. Helen's Island to 35 ft.; extending of the ship channel along the entire harbor to the canal; building of a channel 10,000 ft. long south of St. Helen's Island; the erection of about 40 islets or mounds above Victoria bridge to hold the ice in the spring; the raising of the wharves below the Victoria pier to high-water level and covering them with sheds. The works proposed it is estimated will cost about \$18,000,000, and their construction will be spread out over 12 years. The plans have been prepared by the Commissioners' Chief Engineer, F. W. Cowie.

The Navigator or Mariners' Guide, by Capt. R. M. Pugsley, late Master of the U.S. Transport Service, has been issued in a new and revised edition by the New Jersey Paint Works, Jersey City, N.J. Of the first edition, 15,000 copies were issued, and the second edition, of which a similar number has been issued, is enlarged and revised. The work is intended to provide in a handy and comprehensive form, for the general use of navigators, yachtsmen and others interested in marine matters, a large amount of valuable information, nautical tables, calculations, etc., not usually available in a sufficiently handy form. All the subjects treated of in the different sections of the volume, are of practical value, and are dealt with by a practical navigator, in a manner easily understood, by even those who are only studying navigation. The text is illustrated with cuts of vessels, signals, etc., and 18 charts have been prepared for distribution with the volume, nine for U.S. ports on the Atlantic coast, and nine for U.S. ports on the Pacific coast. The price of the volume is \$2.

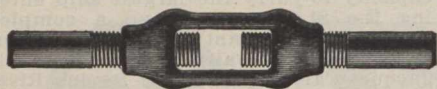
LIST OF STEAM VESSELS REGISTERED IN CANADA DURING MARCH, 1910.

Name	No.	Where and When Built.	Engines, etc.	Length	Breadth	Depth	Gross Tons	Reg. Tons	Port of Registry	Owners
Muirneag	126,738	Steveston, B. C., 1910.	Screw 2 n. h. p.	35.5	10.3	4.4	12	8	Vancouver, B. C.	D. McDonald, Vancouver, B.C.
Paystreak	126,279	New Westminster, B.C. 1909	Paddle 9 "	126.5	26.4	4.9	382	201	New Westminster B.C.	Royal City Navigation Co., New Westminster, B.C.
Rosina K	126,736	North Vancouver, B.C. 1910	Screw 9 "	56.1	13.0	5.8	33	22	Vancouver, B. C.	T. Kickham, Vancouver, B.C.
Rosswynne	126,737	Vancouver, B. C., 1909.	" 2 "	85.0	8.0	3.6	9	6	"	A. Ross and J. Wilson, Vancouver, B.C.
Sarnia City	126,227	Sarnia, Ont., 1909	" 84 "	105.0	25.5	12.0	223	68	Sarnia, Ont.	Reid Wrecking Co., Sarnia, Ont.
Senator Derbyshire	112,351	West Bay City, Mich, 1897	" 73 1/2 "	220.0	40.8	16.8	1246	987	Brockville, Ont.	A. Wendling, Brockville, Ont.
Westex	126,740	Vancouver, B.C., 1909	" 1 "	29.4	7.6	4.1	7	5	Vancouver, B.C.	Western Explosives, Ltd., Montreal.
Zephir P.	126,455	Sorel, Que., 1910.	" 21 "	93.0	22.3	7.0	237	119	Sorel, Que.	J. Paquette, Champlain, Que.

LIST OF SAILING VESSELS AND BARGES REGISTERED IN CANADA DURING MARCH, 1910.

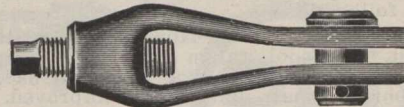
Name	No.	Where and When Built	Rig	Length	Breadth	Depth	Reg. Tons	Port of Registry	Owners
Edith Parly	126,190	Allendale, N.S., 1910	Schr....	82.7	24.6	9.4	79	Shelburne, N.S.	W. Forsey, Grand Bank, Nfld.
Assurance	126,587	LaHave, N.S., 1910	"	97.5	25.8	10.5	99	Lunenburg, N.S.	L. Knock, M.O., Rose Bay, N.S.
Cecil L. Beck	126,586	Lunenburg, N.S., 1910	"	104.6	25.8	10.5	93	"	W. C. Smith, M.O., Lunenburg, N.S.
Fundy	126,098	Welland, Ont., 1909	Dredge	120.0	42.7	9.5	597	St. Catharines, Ont.	Dominion Dredging Co., Ottawa.
Jost	126,592	Port Greville, N.S., 1910	Schr.	134.1	32.2	11.2	299	Parrsboro, N.S.	H. W. Elderkin, M.O., Port Greville, N.S.
Margaret May									
Riley	107,296	Granville, N.S., 1900	"	123.5	30.5	11.2	241	St. John, N.B.	A. Wilson, St. John, N. B.
Mayola	126,588	Bridgewater, N.S., 1910	"	101.4	26.8	10.5	119	Lunenburg, N.S.	E. C. Wenzel, Riverport, N.S.
Percival S. Parks	126,589	LaHave, N.S., 1910	"	96.8	25.6	10.6	109	"	S. Parks, M.O., LaHave, N.S.
Pyrites	126,739	North Vancouver, B.C., 1910.	Barge	89.0	28.2	9.3	207	Vancouver, B.C.	Nicholas Chemical Co., Montreal.
R. M. Co. No. 9 (The)	126,418	U.S.A.	"	125.0	28.0	7.4	230	Toronto, Ont.	Randolph Macdonald Co., Toronto.
Wilfred D.	126,801	Mavillette, N.S., 1910.	Schr.	50.0	15.0	6.4	25	Yarmouth, N.S.	R. J. Deveau, Mavillette, N.S.

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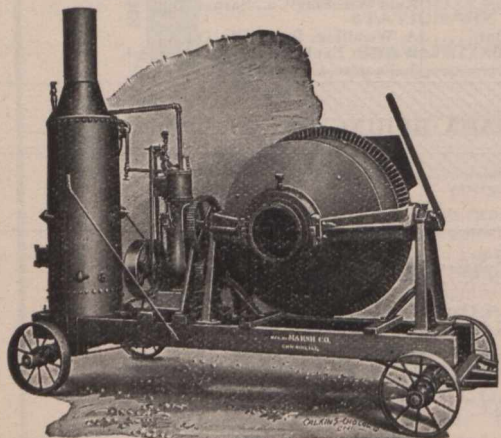
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Use of United States Canals.

If Canadian vessels have the right to navigate U. S. canals, they have shown a great lack of appreciation of that privilege. It is said that for 40 years no boat of Canadian register has passed through a State canal. By the Treaty of Washington, passed in 1871, the boundary waterways were made free to both nations, as were also the canals forming a part of the Great Lakes and St. Lawrence waterway. It was further provided that the U.S. Government would urge on the individual States the desirability of granting similar freedom in the canals owned by them. For the satisfactory fulfillment of the treaty it was necessary for the Federal Government at Washington to take over the canal at Sault Ste Marie from the State of Michigan.

The only record of a Canadian boat being stopped on a State canal is told by Denis Murphy of Ottawa as follows:

"About 1870 or 1871 the late firm of J. W. McRae & Company built six small barges called the A. B. C. D. E. and F. with the intention of running them through to New York with lumber, and having them returned with cargoes of coal. The first trip they were stopped at Whitehall, and after considerable correspondence and much delay to the barges, they were allowed to proceed with the understanding that in the future they would not be allowed further than Whitehall. These barges loaded coal in New York and came back to Ottawa and were kept in the trade here. About this time the forwarders here found this class of barge too small for the trade, and the larger barges were built. These barges were too large to go through the Champlain Canal, so that there was never any further trouble from that source. This one occasion is the only time I know of Canadian vessels being stopped at any of the U. S. canals."

It now seems probable that on account of this one incident a tradition has grown up in Canada that the New York State canals are not open to Canadian vessels. G. H. Perley, M.P., is responsible for investigations which put a new face on the matter. He has discussed the question with the U.S. Consul-General in Canada, and has received from him the following assurance: "The present constitution of the State of New York was adopted Nov. 6, 1904, and went into force Jan. 1, 1895. Since the adoption of this constitution it is my understanding that the canals have been absolutely free to vessels of all nations."

"It is provided by article 97 of this same constitution that: 'No person shall hereafter be imposed on persons or property transported on the canals, but all boats navigating the canals and the owners and masters thereof shall be subject to such laws and regulations as have been, or may hereafter be enacted, concerning the navigation of canals.'

"By the constitution of the State of New York the control and operation of the canals rests with the Superintendent of Public Works. This officer, who should be thoroughly conversant with the conditions and restrictions enforced by the Government, has written in part as follows: 'I beg to say that there has never been any discrimination either by the rules for the management of the canal, or by statutes, against Canadian owned boats, nor is there at the present time.'

"Sec. 172 of chap. 13, laws of 1909, known as the Canal Law, prescribes rules for the registration of canal boats. This section, after providing that the owner of boats navigating the canals shall deliver to properly designated officials a certificate of registry, containing the name of the boat and the hauling point, provides that such registry shall be signed by the owner, if a resident of the State; if not, by the master of the boat as owner thereof."

It would appear, therefore, beyond question of doubt, that the State owned canals in New York are open to Canadian shipping.—Industrial Canada.

Dominion Canals Traffic.

The aggregate of business through the Dominion canals during the season of navigation of 1909 was 33,720,748 tons, against 17,502,820 tons in 1908. The tonnage for the year was distributed as follows:—Sault Ste. Marie, 27,861,245 tons; St. Lawrence, 2,410,629 tons; Welland, 2,025,951 tons; Chambly, 752,117 tons; Ottawa, 336,939 tons; Murray, 102,291 tons; Rideau, 91,774 tons; St. Peters, 79,850 tons; Trent, 59,952 tons. The largest increase was on the Sault Ste. Marie Canal, where the tonnage showed an increase of 15,102,029 tons during the year. In 1900 the aggregate of business through the canals was 5,013,693 tons. The total number of Canadian vessels passing up and down was 22,507, their aggregate tonnage being 7,811,578 tons; and the total number of U.S. vessels using the canals was 9,996, with an aggregate of 16,459,322 tons. The explanation of this disproportion is found in the fact that the business of U.S. vessels is confined almost wholly to the upper lakes, where large cargoes prevail, while many Canadian craft of small capacity pass through the canals east of the Welland. The record of trade for the past five years, however, would seem to warrant the conclusion that an increase is steadily taking place in the tonnage of Canadian vessels. In 1900, the records showed that the number of passages of Canadian vessels was 5,502 with an aggregate of 2,408,985 tons, and the total number of passages of U.S. vessels was 21,755 with an aggregate of 4,129,250 tons.

Canadian Steamboat Inspection.

An order in council has been passed repealing the order in council of Dec. 29, 1904, imposing the provisions of the Canadian Steamboat Inspection Act on steamboats registered elsewhere than in Canada when plying in Canadian waters and engaged in the carriage of freight, and substituting the following:—"Steamboats registered elsewhere than in Canada and trading or plying from one port or place in Canada to another port or place in Canada (but not engaged in the carriage of passengers) shall, if holding a certificate of inspection from any of the following classification societies, namely:—Committee of Lloyd's Register of British and Foreign Shipping, British Corporation for the Survey and Registry of Shipping, or Bureau Veritas, be exempt during the currency of such certificate from the annual steamboat inspection imposed under part VII of the Canada Shipping Act; provided, (a) such inspection is made annually in the United Kingdom, and (b) such certificate is produced on demand to either the Collector of Customs or the steamboat inspector for the district in which such steamboat is trading or plying in Canada."

The Ontario and Ohio Navigation Co., Ltd., has been incorporated under the Dominion Companies Act, with a capital of \$150,000 and office at London, Ont., to acquire and operate steamships on Lake Erie between Port Stanley and Rond Eau, and between Port Stanley and Cleveland and other ports. The provisional directors are:—A. McKay, Ingersoll; P. Pocock, F. G. Rumball, S. W. Mower, London, Ont., and G. W. Parker, Detroit, Mich. The incorporators named are interested in the London and Lake Erie Ry. and Transportation Co., which took over the assets of the South Western Traction Co.

Atlantic and Pacific Ocean Marine.

The C.P.R. s.s. *Empress of Ireland* arriving at Halifax, N.S., at noon, Apr. 14, created a record in her trip from Liverpool, Eng.

Announcement has been made that Canadian Northern Steamships, Ltd., has joined the Canadian North Atlantic Westbound Freight Conference.

The St. Lawrence navigation was opened by the arrival at Montreal, Apr. 11, of the s.s. *Kronprinz Olav*, from Sydney, N.S., with coal.

The Quebec Steamship Co., Ltd., has declared a dividend of 3% for the half year ended Dec. 31, 1909, making 6% for the year. This is the company's 64th dividend.

Sir Thos. G. Shaughnessy is reported to have stated to the President of the Halifax Board of Trade, that the C.P.R. will have two more *Empress* steamships, 630 ft. long, on the Atlantic within two years.

Allan Line officials are reported to have stated recently, that in order to relieve the congestion of passenger traffic between Great Britain and Canada this season, a number of extra vessels may be operated across the Atlantic.

Sir H. Montagu Allan, who returned from England, Apr. 10, is reported to have said that the Allan Line was prepared to take up the question of a faster steamship service as soon as the Government was ready to move in the matter.

The Canada Line, operating between Canada and Germany, which was inaugurated last year in the freight and third class passenger trade, has announced that it will cater for first class passengers this year, and has established accommodation for such on its steamships *Prinz Oskar* and *Prinz Adalbert*.

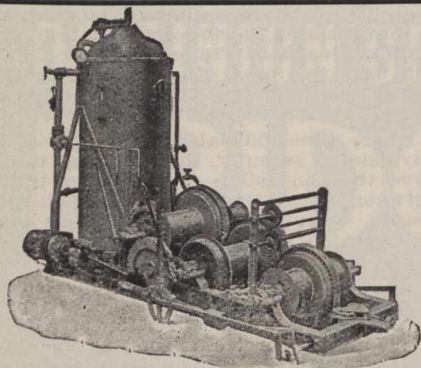
Capt. J. B. Foote, who, it was recently announced, had been appointed Marine Superintendent at Montreal of Canadian Northern Steamships Ltd., has resigned and has been succeeded by — Jones who will be sent out from Great Britain and who will report to the Marine Superintendent at Bristol, Capt. Geo. Gregory.

With reference to the reports in the press regarding an explosion and fire which took place on the s.s. *Cairnrona*, off Dover, Eng., early in April, R. W. Reford & Co., Agents, Montreal, announced, Apr. 8, that they were grossly exaggerated. The vessel returned to London, where her bunkers were refilled, her passengers re-embarked, and sailed again Apr. 16.

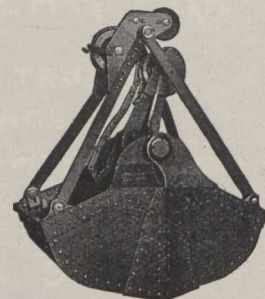
A. Piers, Manager C.P.R. Atlantic Steamship Lines, Liverpool, Eng., was in Montreal in the early part of April, in consultation with the President and Fourth Vice President, in regard to the season's sailings, and other matters. Sir Thos. G. Shaughnessy is reported to have stated, subsequently, that no decision had been reached regarding the construction of new vessels for the Atlantic service.

J. B. Foote, who has been appointed Superintendent Canadian Northern Steamships, Ltd., at Montreal, was born at Owen Sound, Ont., Dec., 1874, and has been connected with navigation nearly all his life. From 1900 to 1903, he was shore captain of the Algoma Central Steamship Line, Sault Ste. Marie, Ont.; and from 1903 to the date of his present appointment has been Superintendent Canadian Lake and Ocean Navigation Co., Toronto.

Canadian Northern Steamships, Ltd., has not as reported in some daily papers obtained two more vessels for its Atlantic service, which for the present is being performed by the *Royal Edward* and the *Royal George*. The s.s. *Volturno*, which was bought from the builders at the

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same time is still leased to the North-west Transportation Co. and is running between New York and Rotterdam via Halifax. She may be placed in the C.N.S. service later this season.

A company has been formed to take over all the shipping interests of the late Sir Alfred Jones, which include the Elder Dempster Co., which operates between Canada and South Africa and Canada and Mexico. The whole of the interests have been purchased by Lord Pirrie, Chairman of Harland and Wolff Ltd., Belfast, Ireland, who is also one of the incorporators of the recently chartered Dominion Dry Dock and Shipbuilding Co., Ltd., which purposes constructing dry docks and other plant at Levis, Que., and St. John, N.B.

The Donaldson Line s.s. Saturnia, which was launched at Scotstoun, Scotland, Mar. 29, is a twin screw vessel, with accommodation for 1,250 passengers. The second and third class accommodation is all arranged as two and four berth cabins, and special attention has been paid to the deck accommodation. The vessel has been constructed to the highest class at Lloyds, and to the Board of Trade requirements. There is ample space for freight, and the most modern equipment for expeditious handling of cargo has been adopted, in addition to the latest type of refrigerating machinery, and a Marconi wireless telegraph installation. The engines are of the triple expansion type, supplied with steam by six boilers. It is reported that another similar vessel will be built shortly, so that the company can maintain a regular weekly service between Canada and Scotland.

Maritime Provinces and Newfoundland.

Capt. S. R. Hill, Inspector of steamboat hulls at Halifax, and formerly captain of the Plant Line s.s. Halifax, died there Apr. 10, aged 58.

The assets of the Newfoundland Steam Whaling Co., Ltd., in liquidation, which were offered for sale towards the end of April, included the steamships Puma and Lynx.

The s.s. Kamfjord, which arrived at North Sydney, N.S., Apr. 12, with manganese ore from Antwerp, for the Nova Scotia Steel and Coal Co., has been chartered by that company for the season.

The Government has despatched a party of wreckers to Sable Island, to break up the hull of the s.s. Skidby, which was wrecked there some years ago, and which is considered a danger to navigation.

The liquidators of the Anglo-Newfoundland Fish Exporting Co., Ltd., St. John's, Nfld., recently sold, by tender, the company's fishing fleet, consisting of 12 schooners and a gasoline launch.

The Newfoundland Colonial Secretary received tenders recently for the conveyance of mails and passengers by steamer between Kelligrews and Bell Island, calling at Portugal Cove and Broad Cove, for five years from May 1.

The Newfoundland sealing steamboat Iceland was caught in the ice on the north-west of the island, Mar. 30, and with her cargo of about 2,500 seals, was lost, the crew escaping over the ice. She was a wooden vessel and was built in 1870.

The St. John's, Nfld., Pilot Commissioners have chartered the steamboat Margerie F., to act as a pilot boat there. She was given a trial spin, Apr. 8, when she was pronounced quite able to perform the work for which she was engaged.

An order in council has been passed, with reference to the order in council

of Apr. 9, 1907, which authorized the establishment of a pilotage district for Minas Basin, N.S., by which the payment of pilotage dues within the limits of the district is made compulsory.

Tenders have been asked for the construction of a steel steamboat and a wooden side-wheel vessel for use in Halifax harbor, and it is stated that for the same purpose, an offer of \$25,000 has been made for the ferry steamer Englewood, which is plying on the Hudson River.

The total value of the winter season's trade at St. John, N.B., was reported Apr. 9, as being \$19,805,280. Cattle shipments, which were lighter than in previous years, totalled 4,341 head; grain 6,821,279 bush.; flour 743,760 sacks. Both of the latter are a distinct advance on the figures of 1908-9.

The Shipmasters' Association of Canada has been formed in Halifax, N.S., consisting of masters and mates of Canada and Newfoundland. The object of the association is to secure the protection of its members in case of legal difficulty. Following are the officers for the current year: President, C. Hunter; Vice President, — Norris; Secretary, J. Murphy; Treasurer, D. A. Scott.

Press reports state that J. Doran of Quebec, is about to inaugurate a ferry service between Sydney and North Sydney, N.S., and also that another scheme is in process of organization, to purchase and operate a double ended ferry transfer between Sydney and Westmount on an hourly schedule. It is stated that tenders have been received for the construction of a suitable vessel, and as soon as the business is financed it will be put through.

A bill, which was introduced into the House of Commons, Apr. 13, by the Minister of Public Works, authorizes the city of St. John, N.B., to convey land, bounded on the north by the prolongation westerly of the south line of Sheffield St., on the east by the westerly line of Charlotte St., on the south by the Government ballast wharf property and on the west by the city harbor line, for a site for the erection of buildings, wharves, docks and other necessary improvements. F. C. Durant of Philadelphia, Pa., is chiefly interested in the development.

The Dominion Government steam tug Canso, which was launched recently at Yarmouth, N.S., is built of steel to class 100 A1 at Lloyds, her dimensions being, length overall, 97.6 ft., beam 22 ft., mean draught 8.6 ft. She is built on the frame and reverse system, spaced 21" throughout, with five steel water tight bulkheads. The decks are of steel sheathed with hard wood, and the fore and aft peak tanks have a water carrying capacity of 20 tons. The deckhouse, 47' 6" by 14' 6" accommodates the captain's and chief engineer's quarters, bathroom, and there are lamp and refrigerator rooms fore and aft of the deckhouse. Dining room and other accommodation is provided below, adjoining the engine room, with crew's accommodation forward. The engines are of the triple expansion type, with cylinders 12, 19 and 30 ins. diam., by 20 ins. stroke, developing about 400 h.p. Other machinery includes centrifugal pump, direct steam windlass, steam steering gear, hydraulic ash ejector, etc. The boiler is 9' 6" long by 11 ft. diam., for a working pressure of 180 lbs.

Province of Quebec Marine.

The Quebec Steam Whaling Co., Ltd. Montreal, is to be wound up. S. R. Gauthier has been appointed liquidator.

J. A. Smith, assistant engineer Department of Marine agency at Quebec, has been appointed measuring surveyor of shipping for the port.

The Montreal Board of Trade has decided to ask the Department of Railways and Canals, that, in future, the St. Lawrence canals be opened for traffic much earlier than hitherto.

The Levis Ferries, Ltd., is reported to have placed orders in Levis, for the construction of ice-breaking ferry steamboats for the winter service between Quebec and Levis.

The act amending the Richelieu and Ontario Navigation Co.'s charter powers details of which were given in our April issue, has been passed by the Dominion Parliament.

The Quebec Steamship Co., which recently purchased the s.s. Fastnet from the Clyde Shipping Co. of Glasgow, Scotland, has decided to change its name to Cascapedia. She sailed from Glasgow Apr. 8, for Montreal, where she was placed on the Gaspé route, her first sailing taking place from Montreal, Apr. 25.

The Dominion Fish and Fruit Co., Ltd., has been incorporated under the Quebec Companies Act, with a capital of \$375,000 and office at Quebec, to carry on a general business of staple commodities, fish, vegetables and fruit, and in connection therewith to own and operate steam and other vessels, wharves, docks, warehouses, etc., and to transport freight and passengers.

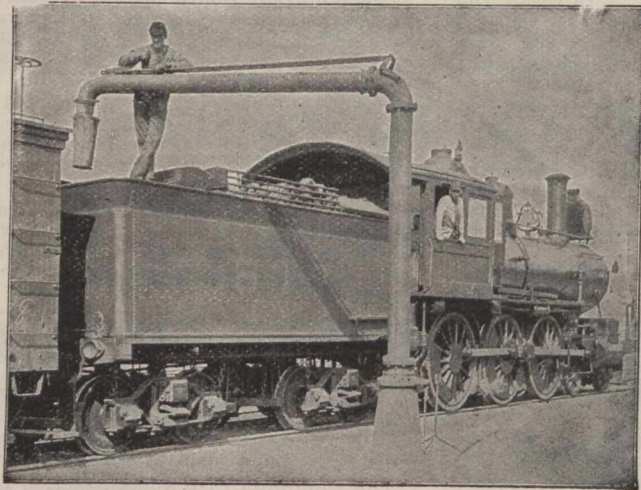
The Department of Agriculture is calling for tenders for the construction of a steel steamer for the quarantine service for fresh water at Grosse Isle, Que., of the following dimensions: length, extreme, 113' 3"; beam, 23 ft.; depth, 12' 6". The vessel, with the exception of the dimensions, will be similar to the one at present building at Dartmouth, Eng., description of which was given in our March issue.

The Montreal Coaling and Salvage Co., Ltd., has been incorporated under the Dominion Companies Act, with a capital of \$40,000 and office at Montreal, to carry on a general stevedoring business, including the loading and discharging of all kinds of vessels, coaling, bunkering and cleaning, etc.; to operate salvage and wrecking plants, steam and other vessels. The provisional directors are H. St. G. Lindsay, E. H. Howard, H. U. P. Aylmer, J. deWitt and H. C. McNeill, Montreal.

Work on the extension and betterment of the facilities in Montreal harbor, was commenced Apr. 18. G. W. Stephens, Chairman of the Commission, stated on his return from Europe, Apr. 16, that the work to be done during this year included the conversion of Victoria into a high level wharf, thus increasing the port accommodation from 20 to 25 ocean-going vessels; the construction of a high level double track railway from Victoria pier eastward for seven miles and also a considerable amount of dredging.

The Dominion Dry Dock Co., Ltd., has been incorporated under the Dominion Companies Act, with a capital of \$1,000,000 and office at Quebec, to carry on the business of shipbuilding, repairing, salving, etc., to construct and operate dry and wet docks, harbors, wharves, elevators, vessels of all descriptions, and for other purposes. The provisional directors are, Sir Thomas G. Shaughnessy, H. A. Allan, Montreal; G. D. Davie, W. M. Dobell, Quebec; W. E. Foster, St. John, N.B.; Rt. Hon. W. James, Lord Pirrie, Belfast, Ireland; Sir Robert W. Perks and A. M. Grenfell, London, Eng.

The board appointed under the Industrial Disputes Act to report on the rate of wages and the bonus system in use on the Montreal wharves, has reported to the Minister of Labor against the bonus system. The wage scale is left unchanged at 30c. per hour for day rate and 35c. for night rate. In place of the bonus system, under which 2½c.



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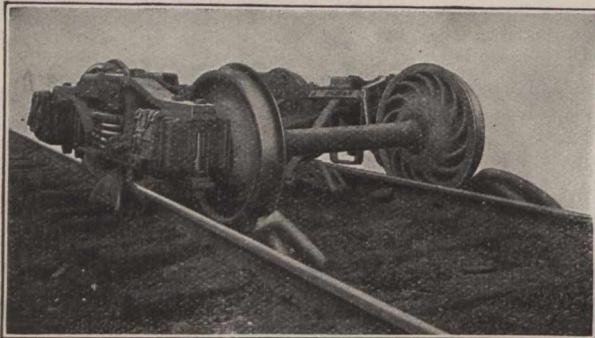
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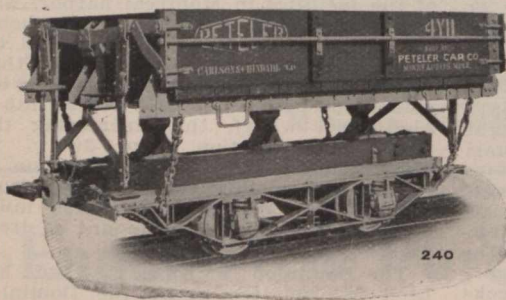
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per hour was retained from each man's wages until the end of the season, it is provided that the steamship federation and the syndicated longshoremen shall each deposit \$2,000 with a trust company, and that each man shall sign an individual contract with the federation. In case he fails to carry out his agreement the \$2,000 may be levied upon for non-fulfilment of contract. The report was unanimous and states that the assurance was given that the recommendations would be carried out by both parties. The agreement stands for five years.

Ontario and the Great Lakes.

A steam tug, for use in the harbor, was launched at Owen Sound, Apr. 13, and named George H. Jones.

The Welland canal was officially opened for traffic Apr. 15, but no vessels were on hand to make the passage.

The car ferry Marquette and Bessemer No. 2, which sank in Lake Erie about Dec. 7, 1909, with all on board, has been located near Port Bouce, Ont.

The name of the barge Sandy Hook, no. 126094, registered at St. Catharines, has been changed by order in council to Geraldine Battle.

Press reports state that a car ferry service between Sodus Point, N.Y., and Cobourg, Ont., in connection with the Pennsylvania Rd., is under consideration.

Press reports state the Dominion Government intends constructing an additional pier for the accommodation of vessels at Port Colborne.

The first vessel of the season to pass the Sault Ste. Marie Canadian canal, was the W. H. Mack, on Apr. 12, on which date the canal was officially opened.

The Western Navigation Co.'s officers for the current year, elected at a recent meeting, are, President, J. Murphy; Vice President, E. R. Wayland; Secretary, H. W. Robinson.

The Canadian Northern Ry. is reported to have decided to make extensions at its coal and ore docks at Port Arthur, which will increase the storage capacity by 50,000 tons.

The Department of Railways and Canals received tenders, Apr. 28, for the removal of the range beacon and for the widening of the channel at the upper entrance to the Sault Ste. Marie canal.

The Imperial Oil Co., Sarnia, recently ordered in England an additional tank steamboat for its oil trade. It is expected that the vessel will arrive on the lakes about July 1.

The Northern Navigation Co.'s s.s. Hamonic is undergoing repair at Lorain, O., after having been somewhat damaged last fall at Point Edward when a large barge broke loose among the shipping there.

The Northern Navigation Co.'s steamboat City of Midland, after having her boilers overhauled at Owen Sound during the past winter, has been docked at Collingwood for minor repairs before being placed on her summer route.

The Department of Railways and Canals received tenders, Apr. 26, for the construction of section 6 of the Ontario-Rice Lake division of the Trent canal, and is asking for tenders for similar work regarding section 4.

Capt. Argue, of Parry Sound, is reported to have purchased a small passenger steamboat, which has been recently constructed at Kingston, on behalf of the C.P.R., for operation between Parry Sound and Little Current.

The C.P.R. s.s. Athabasca, which was damaged at the close of last season on Flower Pot Island, near Owen Sound, has been thoroughly overhauled during the winter, and in addition has been

lengthened 36 ft., making her 291 ft. over all.

The Toronto Board of Trade and the Toronto branch of the Canadian Manufacturers' Association each sent telegrams to the Government, Apr. 15, calling attention to the urgency of the need for the enlarging and deepening of the Welland canal.

The Canada Shipping Co.'s steamboat D. A. Gordon, which was recently built at Glasgow, Scotland, sailed from Newport, Eng., Apr. 16. She is a full sized canal boat, and will be utilized in the grain trade between Montreal and the Upper Lakes.

Supplementary letters patent have been issued under the Ontario Companies Act, increasing the number of directors of the Western Dry Dock and Shipbuilding Co., Ltd., from three to five; authorizing the company to hold meetings outside Ontario, and changing the head office from Toronto to Port Arthur.

The dues collected at the Government dry dock at Kingston, during 1909, were \$14,488.84, and expenditure \$6,603.03, leaving a surplus of \$7,884.81. There were 59 vessels docked having a total tonnage of 37,295. The dock has been leased to the Kingston Shipbuilding Co., Ltd., for 21 years.

The Keystone Transportation Co.'s steamboat Keystorm was launched at Wallsend-on-Tyne, Eng., recently. She is of full canal size, with capacity of 100,000 bush. on a 14 ft. draught, but for 150,000 bush. in lake service only. She is similar to the company's steamboats Key West and Keyport, descriptions of which we have already published.

The U. S. Lake Survey reports the levels of the Great Lakes in feet above tide water for March, as follows:—Superior, 601.54; Michigan and Huron, 580; Erie, 571.68; Ontario, 245.75. Compared with the average March levels for 10 years, Superior was 0.45 ft. below; Michigan and Huron, 0.15 ft. below; Erie, 0.11 ft. below, and Ontario 0.32 ft. above.

The interests controlled by J. Playfair, Midland, which have acquired the Inland Navigation Co., Hamilton, the Midland Navigation Co., and the Empress Transportation Co., of Midland, have, it is reported, awarded a contract for the construction of a steel hulk freighter, 525 ft. long by 56 ft. beam, delivery to be made in time for the fall trade.

With reference to the recent reports that the Richelieu and Ontario Navigation Co. was negotiating for the purchase of the Hamilton Steamboat Co. and the Turbine Steamship Co., press reports state that the matter came up for discussion at the R. and O. N. Co.'s board meeting Apr. 14, but that nothing definite was accomplished.

Press reports state that the Upper Ontario Steamboat Co., and the Montreal River Navigation Co., are negotiating for an amalgamation of their interests. Both companies operate on the Montreal River, and the chief object of the proposed arrangement is to secure a more efficient service, by dividing the passenger and freight service.

Press reports from Halleybury state that the Temiskaming Navigation Co. has acquired control of the Halleybury Navigation Co., and that in future the two concerns will be managed by one board of directors. It is said that an agreement has been effected whereby the rates which were in force prior to the amalgamation shall be maintained.

The Ogdensburg Coal and Towing Co. is reported to have purchased the steamboat A. McVittie from the Rutland Transit Co., for operation in the Lake Ontario and St. Lawrence coal trade. She was built in 1890, her dimensions being: length, 240 ft.; breadth, 42 ft.; tonnage, 2,046 gross, 1,552 net. She is

equipped with fore and aft engines, with cylinders 28 and 52" diam., by 40" stroke.

The Brockville Navigation Co. has sold the steamboat Victoria to Capt. Davis, of Smith's Falls, Ont., who, it is stated, will use the vessel on the Rideau Lakes. The Victoria was built at Kingston, Ont., in 1900, her dimensions being: length, 72.6 ft.; breadth, 15.5 ft.; depth, 5 ft.; tonnage, 58 gross, 40 register. She is equipped with engine of 3 n.h.p., driving a screw.

The steam barge D. D. Calvin, which was recently sold by the Calvin Co., Garden Island, Ont., to Carlot and Smith, Belleville, was badly damaged by fire at Garden Island, April 11. She was built at Garden Island in 1883, her dimensions being: length, 166 ft.; breadth, 32 ft.; depth, 15.1 ft.; tonnage, 750 gross, 483 register. She is equipped with engine of 300 n.h.p. driving a screw.

The Canada Shipping Co., Ltd., has been incorporated under the Dominion Companies Act, with a capital of \$20,000 and office at Montreal, to carry on a general shipping business; and to own and operate steam and other vessels. The provisional directors are:—H. Munderloh, C. Byrd, W. T. S. Burns, C. Rinfret and R. Ball, Montreal.

The Dredging and Drainage Co., of Ontario, Ltd., has been incorporated under the Ontario Companies Act, with a capital of \$50,000 and office at Toronto, to contract for the construction of public works, and in connection therewith to own and operate steam and other vessels. The provisional directors are, J. E. Russell, E. W. Wright and H. T. Hunter, Toronto.

Canadian Northern Steamships, Ltd., announces an all water route from Great Britain to Port Arthur, with one transshipment only, instead of two as heretofore. Freight will be transhipped at Montreal from the company's trans-Atlantic vessels to the lake vessels operated by the Canadian Lake and Ocean Navigation Co., which will proceed direct to Port Arthur.

Replying to questions in the House of Commons recently on the appropriation of \$250,000 for Toronto harbor improvements, the Minister of Public Works stated that it would be useless to make the new entrance deeper than 18 ft., until the Welland Canal was deepened. The matter could be taken up later, if necessary, the ultimate cost of the work not being greater than if done now.

J. W. Norcross & Co., Ltd., has been incorporated under the Ontario Companies Act, with a capital of \$25,000 and office at Toronto, to act as managers, agents and brokers for transportation companies; to own and operate steam and other vessels, docks, harbors and other facilities. The provisional directors are:—J. W. Norcross, R. M. Wolvin and W. E. Burke, Toronto.

The Dominion Government has guaranteed the bonds of the Western Drydock and Shipbuilding Co., Port Arthur, Ont., to the extent of \$1,200,000. The contract for the construction of the works has been let, and it is said that by the summer of 1911, the first two vessels to be built by the company will be launched. These vessels, it is said, will be 524 ft. long, with a capacity of 10,000 tons.

The Niagara, St. Catharines and Toronto Navigation Co.'s steamboat Garden City arrived at Toronto Apr. 11, from St. Catharines, which is about a month earlier than in previous years. She will be operated between these points daily until June, when the regular summer service will commence. It is reported that the company's steamboat Lakeside will probably be sold for other less exacting service, and another vessel purchased.

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NOTICE.—Application will be made on behalf of the Saskatchewan Midland Railway Company and the Canadian Northern Railway Company to the Board of Railway Commissioners for Canada at the Board's Office, Ottawa, on 10th May, 1910, at 10 o'clock in the forenoon, or as soon thereafter as the said application can be heard, for a recommendation to the Governor General in Council for the sanction of an agreement amalgamating the said companies.

Dated at Toronto this 24th day of March, 1910.

R. H. M. TEMPLE,
Assistant Solicitor.

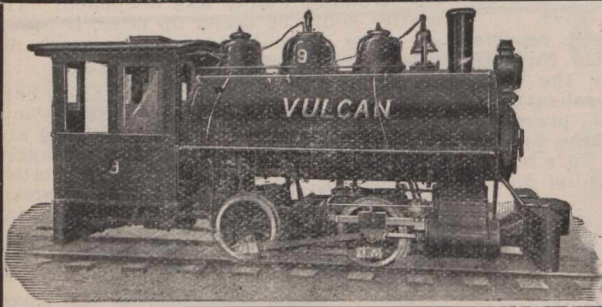
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The Algoma Central Steamship Line's steamboat T. J. Drummond, which has been built at Dumbarton, Scotland, especially for the rail trade, is expected to reach the lakes early in May. Her dimensions are, length overall, 257 ft.; length, between perpendiculars, 247 ft. 9 ins.; beam, 43 ft. 8 ins.; depth, 26 ft. The machinery consists of engines with cylinders 20½, 33 and 54 ins. diam., by 36 ins. stroke, supplied with steam by two Scotch boilers, 10½ by 14 ft., at a pressure of 190 lbs.

A vessel will be launched at Glasgow, Scotland, May 1, for the Point Anne

CANADA SOUTHERN RAILWAY COMPANY.

The annual general meeting of the Canada Southern Railway Company for the election of directors and other general purposes will be held on Wednesday, the 1st day of June, 1910, at the hour of eleven o'clock in the forenoon, at the offices of the Company, in the city of St. Thomas.

NICOL KINGSMILL,
Sec. C.S.R. Co.

23rd April, 1910.

NOTICE.

NIAGARA GRAND ISLAND BRIDGE COMPANY.

The Annual General Meeting of the Niagara Grand Island Bridge Company, for the election of Directors and other general purposes, will be held on Wednesday, the 1st day of June, 1910, at the hour of eleven o'clock in the forenoon, at the Company's Head Office, in the City of St. Thomas.

NICOL KINGSMILL,
Secretary N.G.I.B. Co.

April 23rd, 1910.

NOTICE.

NIAGARA RIVER BRIDGE COMPANY.

The Annual General Meeting of the Niagara River Bridge Company, for the election of Directors and other general purposes, will be held on Wednesday, the 1st day of June, 1910, at the hour of eleven o'clock in the forenoon, at the offices of the Canada Southern Railway Company, in the City of St. Thomas.

NICOL KINGSMILL,
Secretary N.R.B. Co.

April 23rd, 1910.

Quarries Ltd., of which M. J. Haney, Toronto, is the principal owner. The vessel will be used for grain between Montreal and Fort William, and is the first of a number of freight vessels which it is proposed will be put on this route by the company. The vessel, which will be named Renvoyle, has a steel hull, and her dimensions are, length 250 ft., breadth 42½ ft., depth 18½ ft., with a capacity of 100,000 bush. The cost has been quoted at \$125,000.

The Dominion Parliament has amended the Navigable Waters Protection Act, repealing secs. 4 and 5, and substituting others, which provide that no bridge, dam, wharf or other structure shall be built in or across any navigable water, unless the site has been approved by the Governor in Council, such provisions not, however, applying to small wharves, not costing more than \$1,000, nor to beach protection works, boathouses, etc., which do not interfere with navigation; and any buildings built on any site not so approved, nor in accordance with plans so approved they may be removed and destroyed under the authority of the Governor in Council.

In pursuance of the U. S. statute approved March 10, entitled "An Act concerning tonnage duties on vessels entering otherwise than by sea," and as the result of negotiations since carried on, harbor masters in Ontario ports affected by the order in council of Dec. 1909, have been notified from Ottawa to waive the collection of fees from U. S. vessels entering on and after April 1, 1910; and collectors of Customs in U. S. ports on the lakes have also been officially notified from Washington under that vessels entering from Ontario on and after Apr. 1, will be exempt from the tonnage duty imposed by the U. S. Statute of Aug., 1909. This completes the restoration of the reciprocal arrangement between the U. S. and Ontario existing prior to last summer.

The Porcupine Trading and Transportation Co., the incorporation of which we announced in a recent issue, will operate chiefly on Frederickhouse River and Lake and Night Hawk Lake. It was originally intended to build a number of stern wheel boats for this trade, but subsequent examination led to the conclusion that it was doubtful if they could, at present, be successfully operated there. The management considers that the only kind advisable to operate for the immediate future are large pointers equipped with gasolene engines, and gasolene launches. It is intended to build eight of these with capacity varying from two to 10 tons each, some of which will be equipped with gasolene engines, of suitable size and strength. This year's experience will enable the company to judge better of the kind of boat which can be operated with advantage.

Manitoba, Saskatchewan and Alberta.

The Northern Fish Co.'s steamboat Wolverine was considerably damaged by fire while in the dry dock at Selkirk, Man., undergoing repairs prior to going on her summer route. The damage was almost confined to the fittings, the machinery and hull not having suffered much. Repairs are being made at once, and it is expected that the vessel will be ready for service early in June. She was built at Selkirk, Man., in 1903.

The Railway Committee of the House of Commons, April 13, by a vote of 53 to 51, refused to pass the bill for the incorporation of the International Waterways Canal and Construction Co. The Company proposed to construct an 8 ft. canal from the mouth of Pigeon River, Lake Superior, to the Lake of the Woods, thence to Red River and Lake Winnipeg; or from the Lake of the Woods by the Winnipeg River to Lake Winnipeg. The primary object of the company was to generate electrical energy and to dispose of it in Canada and the United States. L. Coste, of the Canadian Section of the International Waterways Commission, stated that there were no engineering difficulties in the way of construction, and it was possible that it would not cost over \$20,000,000. By its construction it would be possible to develop 1,000,000 h.p. within the district served.

B.C. and Pacific Coast Marine.

The Union Steamship Co.'s new vessel, which is to be named Cheslakee, is expected to reach Vancouver in July.

The Alaska Steamship Co. has purchased the s.s. Leelanaw from R. Dunsmuir and Sons, for operation between Seattle, Wash., and Nome, Alaska. The price paid is stated to have been \$80,000.

It is reported that the G.T.P.R. Pacific Coast Service will operate a vessel between Prince Rupert and San Pedro, Cal., in order to deal with the anticipated movement northwards during the coming season.

The Michigan Towing Co., Ltd., has been incorporated under the B.C. Companies Act, with a capital of \$25,000, to own and operate steam and other vessels, and in connection with such operation to acquire any postal subsidies.

The West Vancouver Transportation Co., Ltd., has been incorporated under the B.C. Companies Act, with a capital of \$50,000, to own and operate steam and other vessels, and to carry on a general transportation business on B.C. waters.

Ship Poltalloch, Ltd., has been incorporated under the B.C. Companies Act with a capital of \$24,000, to purchase the ship Poltalloch, owned in Portland, Ore., and to carry on a general freight-

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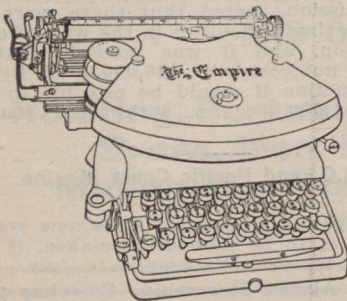
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ing business with same or any substituted vessel.

Press reports from London, Eng., state that arrangements have been practically completed for financial aid for the necessary increases proposed to be made at Esquimalt yards, in anticipation of the construction of vessels for the proposed Canadian navy.

The steamboat Victorian, a U.S. vessel, which at different times has been operating between Victoria and Seattle, and also in the neighborhood of Vancouver, and which is said to have cost \$125,000 to build, was offered for sale recently, when \$11,300 was the highest bid.

British Columbia press reports state that the Dominion Government is making a plan of the inner harbor at Victoria, between the entrance at Hospital Point and the Esquimalt and Nanaimo bridge. It is said that this work is being carried out in preparation for a general scheme of harbor improvement.

Press reports from Vancouver state that the G.T.P.R. will build an additional wharf there during the summer. It will be about 1,000 ft. long, running in the direction of the harbor mouth. The Government wharf, which it is stated will be constructed at the same time, will be 600 ft. long by 60 ft. wide, and will cost \$70,000.

The Otis Staples Lumber Co., Ltd., has been incorporated under the B.C. Companies Act, with a capital of \$750,000, to carry on the general business of sawmill proprietors, lumbermen, etc., and in connection therewith to own and operate

steam and other vessels, and to carry on a general business of transportation of passengers and freight, by land and water.

The Pacific Whaling Co. is adding two steam whaling vessels to its fleet, these being now on their way to Victoria. One of them was purchased at St. John's, Newfoundland, and the other has been constructed in sections at Christiania, Norway, and shipped to Victoria, where it will be built. Press reports state that two similar vessels are also being constructed in like manner in Norway, for the Queen Charlotte Whaling Co.

Canadian Ports and Harbors.—The Department of Marine has issued a directory to the principal ports and harbors of Canada, to which is added a description of new types of aids to navigation introduced in all Canadian waterways. The directory is confined to ports where the tonnage of vessels entered in 1908 was upwards of 50,000. Details are given of wharf and shed areas, depth of water, anchorage, facilities for loading, unloading, pilot charges, and a variety of other information useful to shipowners, mariners, importers, exporters, traders, insurance corporations, and others interested in the navigation of Canadian waters. Views showing a number of the harbors are given, as well as a number of plans, but the most important of the insets is a map showing the quick flashing lights on the Atlantic coast, and the St. Lawrence Gulf and River. The sign given at each point where there is a

light shows not only whether it is a first, second or third order light, but also the number and interval of the flashes; and the new lights which are being installed. The directory, which is arranged in the form of a report, was compiled by G. J. Desbarats, Deputy Minister of Marine and Fisheries.

Vessels Removed from the Register.—

The following vessels were removed from the register during March for the reasons assigned:—Steam—Ida, Port Arthur, 13 tons, out of existence; Lady of the Lake, Toronto, 7 tons, broken up; Maud S., Collingwood, 11 tons, broken up; Odessa, Collingwood, 8 tons, broken up; Picnis, Vancouver, 3 tons, burnt; Reliever, Midland, 366 tons, burnt. Sailing—Beulah Benton, Weymouth, 36 tons, broken up; Emma F., Lunenburg, 13 tons, broken up; Mindoro, Lunenburg, 80 tons, burnt; Minnow, Lunenburg, 35 tons, broken up; Norwood, Maitland, 1,597 tons, stranded; Squid, Vancouver, 51 tons, broken up; Twilight, Barrington, 37 tons, broken up.

The Delaware and Hudson Co. has constructed at Lake George, N.Y., a marine railway to facilitate the unloading of launches from railway cars direct into the water. A submarine track extends from the shore into deep water, permitting a boat having 6 ft. draught to be floated clear of the cars. This avoids all possibility of damage by handling in the old way, and the tariffs filed by the traffic department concerning the service indicate that in addition to the great improvement in service, boat owners will find it more economical.

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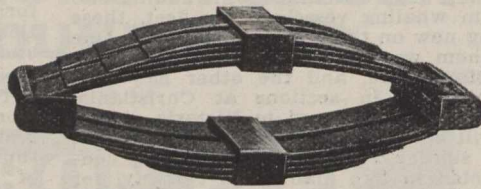
- Accumulators, Electric**
Tate Accumulator Co. of Canada, Toronto.
- Aerated Waters**
E. L. Drewry Winnipeg.
- Air Brakes and Fittings**
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- Alloys**
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- Angle Bars**
Hamilton Steel & Iron Co.Hamilton, Ont.
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Nova Scotia S. & C. Co., New Glasgow, N.S.
- Anti Rail Creepers**
The Holden Co., Ltd. Montreal.
- Automobiles**
Preston Car & Coach Co., Preston, Ont.
- Axes**
James Smart Mfg. Co. Brockville, Ont.
- Axles**
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James Hutton & Co. Montreal.
Nova Scotia S. & C. Co., New Glasgow, N.S.
Pittsburg Forge & Iron Co., Pittsburg, Pa.
Jas. W. Pyke & Co. Montreal.
- Beacons**
International Marine Signal Co. Ottawa.
- Bearings, Side**
Canadian Car and Foundry Co. Montreal.
Chicago Railway Equipment Co. Chicago.
- Blankets and Bedding**
The Hudson Bay Co.
- Boilers**
Babcock & Wilcox, Ltd. Montreal.
Polson Iron Works, Ltd. Toronto.
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- Boilers, Portable**
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Falls Hollow Staybolt Co. Cuyahoga Falls.
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Babcock & Wilcox, Ltd. Montreal.
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- Bolsters**
Canadian Car and Foundry Co. Montreal.
Canadian Ry. Equipment Co., Welland, Ont.
- Bolts, Bridge**
Montreal Rolling Mills Co. Montreal.
Pittsburg Forge & Iron Co., Pittsburg, Pa.
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- Bolts, Carriage and Machine**
Toronto Bolt and Forging Co. Toronto.
- Bolts, Track**
Montreal Rolling Mills Co. Montreal.
Nova Scotia S. & C. Co., New Glasgow, N.S.
Pittsburg Forge & Iron Co., Pittsburg, Pa.
Toronto Bolt and Forging Co. Toronto.
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Renouf Publishing Co. Montreal.
- Borers, Car Wheel**
John Bertram & Sons Co. Dundas, Ont.
- Braces, Cross Arm**
Montreal Rolling Mills Co. Montreal.
Toronto Bolt and Forging Co. Toronto.
- Brake Beams**
Canadian Car and Foundry Co. Montreal.
Chicago Railway Equipment Co. Chicago.
- Brake Shoes**
Am. Brake Shoe & F'dry Co. Mahwah, N.J.
Canada Iron Corporation, Ltd. Montreal.
The Holden Co., Ltd. Montreal.
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Am. Brake Shoe & F'dry Co. Mahwah, N.J.
Canada Iron Corporation, Ltd. Montreal.
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The B. Greening Wire Co. Hamilton, Ont.
- Brasses, Car**
T. McAvity & Sons St. John, N.B.
- Bridge Numbers**
Acton Burrows, Limited Toronto.
- Bridges**
Canadian Bridge Co. Walkerville, Ont.
Dominion Bridge Co. Montreal.
- Bronze**
American Vanadium Co. Pittsburg, Pa.
- Buckets, Coal, Ore and Concrete**
M. Beatty & Sons, Ltd. Welland, Ont.
Brown Holsting Machinery Co. Cleveland.

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Canadian Bridge Co. Walkerville, Ont.
Dominion Bridge Co. Montreal.
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Dominion Equip't & Supply Co., Winnipeg.
The Holden Co., Ltd. Montreal.
McCord & Co. Chicago, Ill.
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Safety Car Heat. & Light. Co. New York.
- Buoys**
International Marine Signal Co. Ottawa.
- Cables Electric and Feeder**
Chapman & Walker, Ltd. Toronto.
E. F. Phillips Electrical Works. Montreal.
The Wire and Cable Co. Montreal.
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Mussens, Ltd. Montreal.
- Car Movers**
F. H. Hopkins & Co. Montreal.
Mussens Limited. Montreal.
- Cars**
R. M. Burns & Co. Chicago, Ill.
Crossen Car Mfg. Co. Cobourg, Ont.
Canadian Car & Foundry Co. Montreal.
J. T. Gardner. Chicago, Ill.
Hart-Otis Car Co., Ltd. Montreal.
Hicks Locomotive and Car Works. Chicago.
Ottawa Car Co. Ltd. Ottawa.
Pay-As-You-Enter Car Co. New York
Preston Car and Coach Co., Ltd. Preston.
Russel Wheel & Fdry. Co. Detroit, Mich.
Silliker Car Co., Ltd. Halifax, N.S.
- Cars, Logging**
Peteler Car Co. Minneapolis, Minn.
Russel Wheel & Fdry. Co. Detroit, Mich.
- Castings**
American Vanadium Co. Pittsburg, Pa.
Canadian Car and Foundry Co. Montreal.
Crossen Car Mfg. Co. Cobourg, Ont.
Lumen Bearing Co. West Toronto, Ont.
I. Matheson & Co. New Glasgow, N.S.
Russel Wheel & Fdry. Co. Detroit, Mich.
Standard Steel Works Co. Philadelphia, Pa.
- Castings, Brass**
Canadian Bronze Co. Montreal.
Canada Iron Corporation, Ltd. Montreal.
Kerr Engine Co. Walkerville, Ont.
Lumen Bearing Co. West Toronto, Ont.
I. Matheson & Co. New Glasgow, N.S.
Tallman Brass & Metal Co., Ltd. Hamilton.

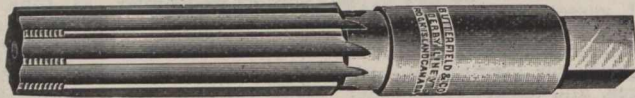
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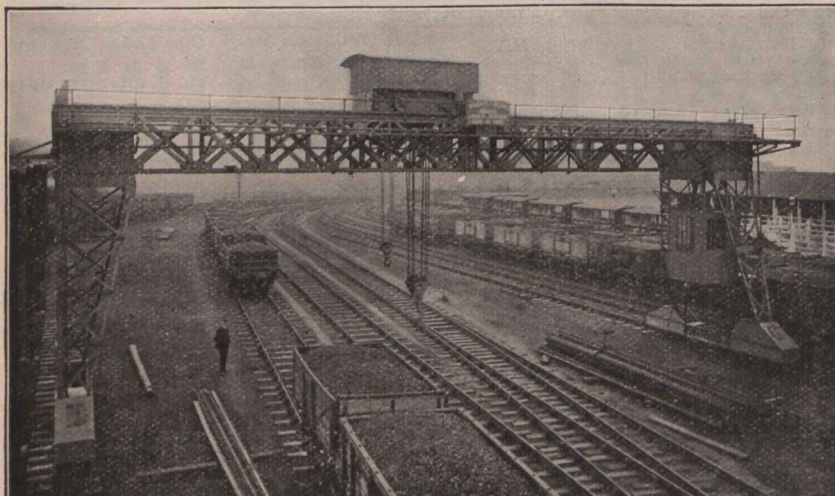
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Polson Iron Works, Ltd. Toronto.
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Allis-Chalmers-Bullock Ltd. Montreal.
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- Furnaces, Corrugated
Continental Iron Works. Brooklyn, N.Y.
- Fuse Batteries
Standard Explosives Limited. Montreal.
- Fuse Detonators
Standard Explosives Limited. Montreal.
- Fuses, Electric
Standard Explosives Limited. Montreal.
- Gaskets
Franklin Mfg. Co. Franklin, Pa.
The Holden Co., Ltd. Montreal.
McCord & Co. Chicago, Ill.
- Gates
New Brunswick Wire Fence Co., Moncton.
Owen Sound Wire Fence Co., Owen Sound.
- Gates, Crossing
General Railway Signal Co. Rochester, N.Y.
The N. L. Piper Ry. Supply Co. Toronto.
- Gauges, Locomotive
Taylor & Arnold. Montreal.
- Gears
American Vanadium Co. Pittsburg, Pa.
- Generators, Electric
Northern Electric & Mfg. Co. Montreal.
- Grates, Shaking
Babcock & Wilcox, Ltd. Montreal.
Polson Iron Works, Ltd. Toronto.
Vandeleur & Nichols. Toronto.
- Groceries
The Hudson's Bay Company.
- Guides and Outfitters
Otto Bros. Field, B.C.
- Hammers, Cast Steel
American Brake Shoe & F'dry Co. Mahwah.
James Smart Mfg. Co. Brockville, Ont.
- Handcars
Canadian Fairbanks Co., Ltd. Montreal.
Crossen Car Mfg. Co. Cobourg, Ont.
Dominion Equip't & Supply Co., Winnipeg.
F. H. Hopkins & Co. Montreal.
Mussens Limited. Montreal.
Rice Lewis & Son. Toronto.
- Hardware
The Hudson's Bay Co.
Rice Lewis & Son. Toronto.
- Hats
W. H. Coddington. Hamilton, Ont.
- Headlights
Commercial Acetylene Co. Toronto.
The N. L. Piper Ry. Supply Co. Toronto.
Pyle National Elec. Headlight Co. Chicago.
- Headlinings
Crossen Car Mfg. Co. Cobourg, Ont.
- Heaters, Feedwater
Robb Engineering Co., Ltd. Amherst, N.S.
- Heating, Car
Canadian Gold Car H'g & L'g Co. Montreal.
Safety Car Heating & L'ting Co. New York.
- Hoists, Electric
American Hoist & Derrick Co. St. Paul.
- Hoists (Pneumatic)
Taylor & Arnold. Montreal.
- Hollow Staybolt Iron and Steel Bars
Falls Hollow Staybolt Co. Cuyahoga Falls.
- Hoppers, Car (Wet or Dry)
Duner Co. Chicago, Ill.
- Hydrants
Canadian Fairbanks Co., Ltd. Montreal.
Kerr Engine Co. Walkerville, Ont.
- Illustrations
Acton Burrows Limited. Toronto.
- Injectors
T. McAvity & Sons. St. John, N.B.
- Inspections
R. W. Hunt & Co. Montreal.
- Insurance, Accident
Can. Casualty & Boiler Ins. Co., Toronto.
Canadian Ry. Accident Ins. Co. Ottawa.
Imp. Guarantee & Acc. Ins. Co., Toronto.
London Guar. & Accident Co., Ltd., Toronto.
- Insurance, Boiler
Canadian Casualty & Boll. Ins. Co. Toronto.
- Insurance, Vessel
Burnett, Ormsby & Clapp, Ltd., Toronto.
- Interlocking Plant and Signals
General Railway Signal Co. Rochester, N.Y.
Montreal Steel Works. Montreal.
Saxby and Farmer, Ltd. Montreal.
- Iron, Pig
Nova Scotia S. & C. Co., New Glasgow, N.S.
- Iron Signs
Acton Burrows Limited. Toronto.
- Iron Staybolt Bars
Falls Hollow Staybolt Co. Cuyahoga Falls.
- Jacks
Canadian Fairbanks Co., Ltd. Montreal.
Dominion Equip't & Supply Co., Winnipeg.
H and E Lifting Jack Co. Waterville, Que.
F. H. Hopkins & Co., Ltd. Montreal.
Montreal Steel Works, Ltd. Montreal.
Mussens Limited. Montreal.
A. O. Norton. Coaticook, Que.
James Smart Mfg. Co. Brockville, Ont.
A. R. Williams Mch. Co., Ltd. Toronto.
- Japans
The Dougal Varnish Co. Ltd. Montreal.
- Journal Bearings
Canadian Bronze Co. Montreal.
Crossen Car Mfg. Co. Cobourg, Ont.
Kerr Engine Co. Walkerville, Ont.
Jas. W. Pyke & Co. Montreal.
- Journal Boxes
The Holden Co., Ltd. Montreal.
McCord & Co. Chicago, Ill.
- Journal Jacks
A. R. Williams Mch. Co., Ltd. Toronto.
- Lager Beer, &c.
E. L. Drewry. Winnipeg.
- Lagging and Covering, Locomotive
Franklin Mfg. Co. Franklin, Pa.
Taylor & Arnold. Montreal.
- Lamps, Arc
Northern Electric & Mfg. Co. Montreal.
- Lamps, Incandescent
Canadian Westinghouse Co. Hamilton, Ont.
- Lamps and Lanterns
The Hudson's Bay Company.
The Hiram L. Piper Co. Montreal.
The N. L. Piper Ry. Supply Co. Toronto.
- Lamps, Switch
The N. L. Piper Ry. Supply Co. Toronto.
- Lathes
John Bertram & Sons Co. Dundas, Ont.
- Laths
J. Harrison & Sons Co. Owen Sound, Ont.
- Lighting, Car
Canadian Gold Car H'g & L'g Co. Montreal.
Safety Car H'g & L'g Co. New York.
- Lights, Contractors' and Wrecking
F. H. Hopkins & Co. Montreal.
International Marine Signal Co. Ottawa.
Mussens Limited. Montreal.
- Locomotives (Compressed Air)
Baldwin Locomotive Works. Philadelphia.
Canadian Locomotive Co. Kingston, Ont.
Montreal Locomotive W'ks (Ltd.) Montreal.

- Locomotives (Electric)**
Baldwin Locomotive Works...Philadelphia.
Montreal Locomotive W'ks (Ltd.)...Montreal.
- Locomotives (Logging)**
Baldwin Locomotive Works...Philadelphia.
Canadian Locomotive Co....Kingston, Ont.
- Locomotives (Rack)**
Baldwin Locomotive Works...Philadelphia.
Canadian Locomotive Co....Kingston, Ont.
Montreal Locomotive Works.....Montreal.
- Locomotives (Steam)**
American Car & Equip. Co....Chicago, Ill.
Baldwin Locomotive Works...Philadelphia.
R. M. Burns & Co.....Chicago, Ill.
Canadian Fairbanks Co., Ltd.....Montreal.
Canadian Locomotive Co....Kingston, Ont.
Dominion Equip't & Supply Co., Winnipeg.
J. T. Gardner.....Chicago, Ill.
Hicks Locomotive & Car Works...Chicago.
Montreal Locomotive W'ks.Montreal.
Vulcan Iron Works.....Wilkesbarre, Pa.
- Lorries, Tracklaying**
Crossen Car Mfg. Co.....Cobourg, Ont.
F. H. Hopkins & Co.....Montreal.
- Lubricators**
McCord & Co.....Chicago, Ill.
Taylor & Arnold.....Montreal.
- Lumber**
Parry Sound Lumber Co.....Toronto.
J. Harrison & Sons Co., Owen Sound, Ont.
- Machines, Cement**
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- Machines and Plant, Contractors'**
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J. T. Gardner.....Chicago, Ill.
General Railway Signal Co., Rochester, N.Y.
F. H. Hopkins & Co.....Montreal.
Mussens Limited.....Montreal.
Toronto Pressed Steel Co.....Toronto.
- Machines and Tools, Prospecting**
The American Well Works ...Aurora, Ill.
- Machines and Tools, Well Drilling**
The American Well Works ...Aurora, Ill.
- Machines, Hoisting**
American Hoist & Derrick Co....St. Paul.
Brown Hoisting Machinery Co....Cleveland.
- Machines, Tracklaying**
F. H. Hopkins & Co.....Montreal.
- Machines, Logging**
Russel Wheel & Fdry. Co....Detroit, Mich.
- Machines, Wood and Iron Working**
Canadian Fairbanks Co., Ltd.....Montreal.
- Machines, Boring and Turning**
John Bertram & Sons Co....Dundas, Ont.
- Machines, Car Shop**
John Bertram & Sons Co., Ltd., Dundas
Greenlee Bros. & Co.Chicago, Ill.
- Machines, Drilling**
John Bertram & Sons Co....Dundas, Ont.
- Machines, Milling**
John Bertram & Sons Co....Dundas, Ont.
- Machines, Planing and Shaping**
John Bertram & Sons Co....Dundas, Ont.
Cleveland Punch & Shear Wks., Cleveland
- Machines, Radial Drilling**
John Bertram & Sons Co....Dundas, Ont.
- Machines, Shaping**
John Bertram & Sons Co....Dundas, Ont.
- Machines, Slotting**
John Bertram & Sons Co....Dundas, Ont.
- Machines, Straightening**
Cleveland Punch & Shear Wks., Cleveland
- Machines, Track**
Greenlee Bros. & Co.Chicago, Ill.
- Machine Tools**
John Bertram & Sons Co....Dundas, Ont.
Pratt & Whitney Co.Dundas, Ont.
- Manhole Frames and Covers**
American Brake Shoe & F'dry Co. Mahwah.
Canada Iron Corporation, Ltd....Montreal.
- Marine Repairs**
Goldschmidt Thermit Co.....Toronto.
- Marine Supplies**
Rice Lewis & Son.....Toronto.
- Metal, Anti-friction**
W. Abbott.....Montreal.
- Metal, Babbit**
Tallman Brass & Metal Mfg. Co. Hamilton.
- Metals**
Goldschmidt Thermit Co.....Toronto.
- Metal Work, Structural**
Canadian Bridge Co.....Walkerville, Ont.
Dominion Bridge Co.....Montreal.
Montreal Locomotive W'ks (Ltd.)...Montreal.
Jas. W. Pyke & Co.....Montreal.
- Millpost Numbers**
Acton Burrows Limited.....Toronto.
- Motors**
Canadian Fairbanks Co., Ltd.....Montreal.
McCord & Co.....Chicago, Ill.
- Motors, Electric**
Allis-Chalmers-Bullock Ltd.....Montreal.
Canadian Crocker Wheeler Co., Montreal.
Chapman & Walker, Ltd.....Toronto.
Northern Electric & Mfg. Co.....Montreal.
Vandeleur and Nichols.....Toronto.
- Motor Generator Sets**
Allis-Chalmers-Bullock Ltd.....Montreal.
Chapman & Walker, Ltd.....Toronto.
Vandeleur and Nichols.....Toronto.
- Motors, Turntable**
Taylor & Arnold.....Montreal.
- Nickel**
The Orford Copper Co.....New York.
- Nickel for Nickel Steel**
The Orford Copper Co.....New York.
- Numbers**
Acton Burrows Limited.....Toronto.
- Nut Locks**
Positive Lock Washer Co....Newark, N.J.
- Nuts, Clevis**
Cleveland City Forge & Iron Co., Cleveland.
- Nuts, Square and Hexagon**
Montreal Rolling Mills Co.....Montreal.
Toronto Bolt and Forging Co.....Toronto
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The Hudson's Bay Company.....
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Can. Office & Sch'l Furniture Co. Preston.
- Office Signs**
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- Oils**
Galena Signal Oil Co..Franklin & Toronto
- Packing**
The N. L. Piper Ry. Supply Co..Toronto.
- Paints**
Standard Paint & Var. Co., Windsor, Ont.
- Patterns**
Hamilton Pattern Works....Hamilton, Ont.
- Pile Drivers, Railway**
F. H. Hopkins & Co.....Montreal.
Mussens Limited.Montreal.
- Pinch Bars**
The N. L. Piper Ry. Supply Co..Toronto.
- Pipe, Culvert (Cast Iron)**
Gartshore-Thompson Pipe Co....Hamilton.
- Pipe, Gas (Cast Iron)**
Gartshore-Thompson Pipe Co....Hamilton.
- Pipe, Sewer (Cast Iron)**
Gartshore-Thompson Pipe Co....Hamilton.
- Pipe Stocks**
Butterfield & Co.....Rock Island, Que.
A. B. Jardine & Co.....Hespeler, Ont.
- Pipe, Water (Cast Iron)**
Gartshore-Thompson Pipe Co....Hamilton.
- Planers**
John Bertram & Sons Co....Dundas, Ont.
- Platforms, Steel**
Standard Coupler Co.....New York City.
- Ploughs, Contractors'**
Mussens Limited.....Montreal.
- Poles**
J. Harrison & Sons Co., Owen Sound, Ont.
- Porter**
E. L. Drewry.....Winnipeg
- Posts**
J. Harrison & Sons Co., Owen Sound, Ont.
- Powder, Blasting**
Standard Explosives Limited....Montreal
- Printing**
Southam Press.....Toronto
- Pumps**
Canadian Fairbanks Co., Ltd....Montreal
S. F. Bowser & Co., Limited.....Toronto
Ontario Wind Engine & Pump Co..Toronto
James Smart Mfg. Co.....Brockville, Ont.
Vandeleur and Nichols.....Toronto.
- Pumps, Centrifugal**
The American Well Works ...Aurora, Ill.
M. Beatty & SonsWelland, Ont
- Pumps, Deep Well, Steam and Power**
The American Well Works ...Aurora, Ill.
- Pumps, Fire Pressure**
The American Well Works ...Aurora, Ill.
- Pumps, Irrigating**
The American Well Works ...Aurora, Ill.
- Pumps, Reclamation**
The American Well Works ...Aurora, Ill.
- Pumps, Sprinkler Systems**
The American Well Works ...Aurora, Ill.
- Pumps, Underwriters' Fire**
The American Well Works ...Aurora, Ill.
- Punches and Shears**
Cleveland Punch & Shear Wks., Cleveland
- Rail Benders, Roller**
Dominion Equip't & Supply Co., Winnipeg.
F. H. Hopkins & Co.....Montreal.
Montreal Steel Works.....Montreal.
- Rail Drilling Machines**
A. B. Jardine & Co.....Hespeler, Ont.
- Rails (new)**
Dominion Iron & Steel Co....Sydney, N.S.
Drummond, McCall & Co.Montreal.
J. T. Gardner.....Chicago, Ill.
J. J. Gartshore.....Toronto.
F. H. Hopkins & Co.....Montreal.
Peteler Car Co.Minneapolis, Minn.
- Rails (for relaying)**
F. H. Hopkins & Co.....Montreal.
J. J. Gartshore.....Toronto.
Mussens Limited.....Montreal.
Jas. W. Pyke & Co.....Montreal.
- Rail Joints**
Goldschmidt Thermit Co.....Toronto.
The Rail Joint Co. of Canada....Montreal.



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