

Canadian Railway and Marine World.

September, 1913.

The Canadian Northern Railway Montreal-Port Arthur Line.

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The Canadian Northern Ry. has been doing some rather remarkable work in filling in the last links of a transcontinental railway system. For over a year it has had under contract nearly 1,000 miles of main line between Montreal and Port Arthur, besides the completion of a branch of 250 miles between Toronto and Ottawa, and the construction of the Montreal tunnel and terminals, this last being the largest and boldest work of the kind which has ever been undertaken in Canada. These works are all on the east end of the railway system, between

Ry. (now nearing completion) approaching it in the matter of ruling grades. The standard in this particular has been 0.6% against the westbound traffic and 0.4% in the opposite direction. One grade of 10 miles in length is 0.5% (compensated for curvature) against eastbound traffic, but with this single exception the standard has never been exceeded in the whole distance of 1,000 miles, and not even reached except for very short distances.

Owing to the extremely rocky and broken character of much of the country

consideration (and at several points a governing one) in working out the location.

It will be of interest now to describe the line somewhat in detail.

Montreal to Lake Nipissing.

The Canadian Northern Quebec Ry., an allied corporation, has a terminal in the east end of Montreal and runs thence northeasterly parallel to the St. Lawrence to Quebec and a number of other important points in the province. About 1½ miles from this terminal, is located a sorting yard and a spur connecting

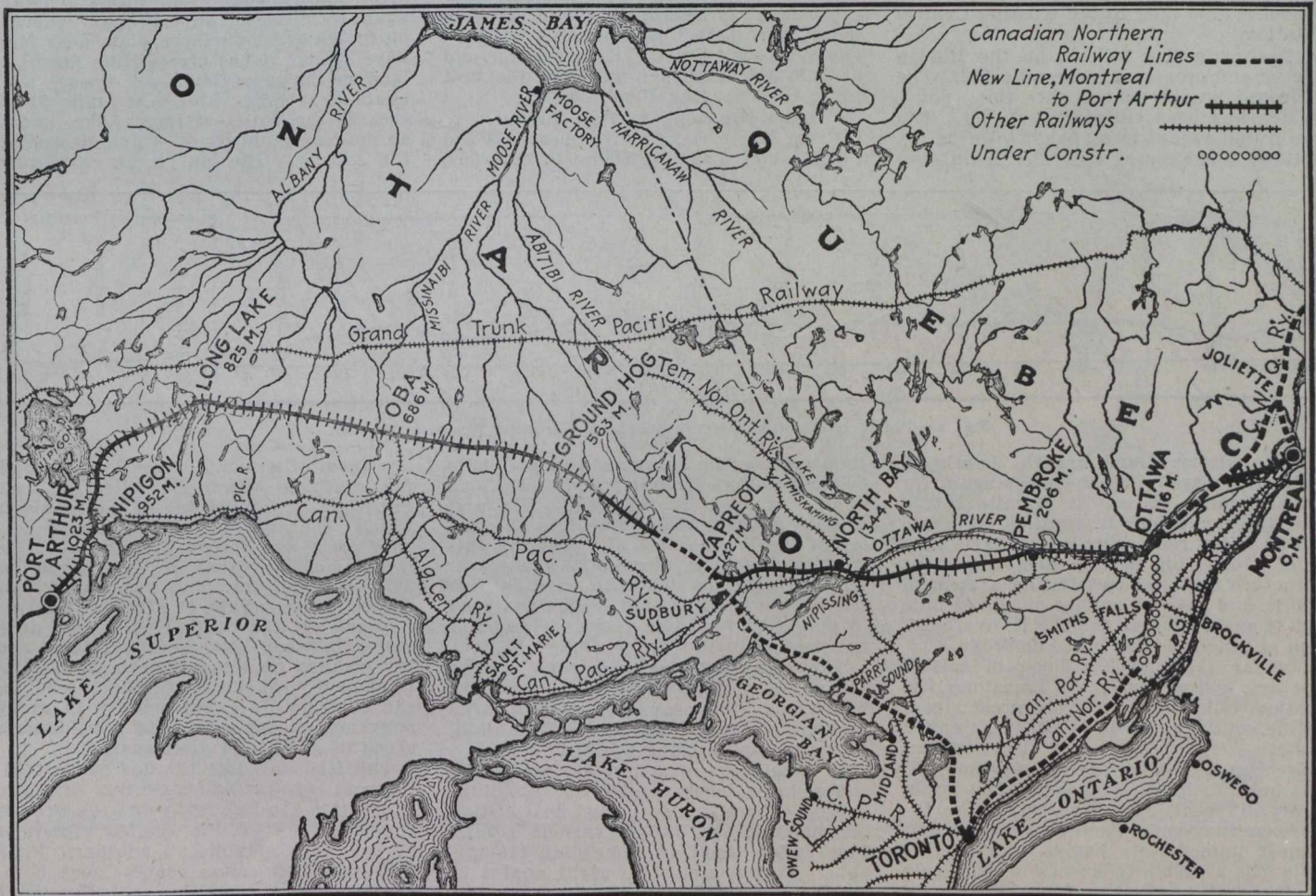


Fig. 1.—Montreal-Port Arthur Section of Canadian Northern Railway's Transcontinental Line.

Lake Superior and the Atlantic, and independent of the line through the Rockies and down the North Thompson and Fraser Rivers to the Pacific, which are not touched upon in this article.

This important link in the C.N.R. transcontinental system is shown in the map, fig. 1, while a condensed profile is given in fig. 2. This line (1,023 miles) is not only one of the longest stretches of line to be undertaken at one time, but it is also unique in the matter of location among Canadian railways, only the Government National Transcontinental

traversed, no attempt has been made to flatten the curvature in the same proportion as the grades. The standard of most Canadian roads is 6°, and this has not been exceeded except in a few isolated cases. The standard obtaining for many hundreds of miles is 4° and less. In another respect the C.N.R. is fully abreast (if not ahead) of the times; that is, the almost total abolition of grade crossings of other railways or of important highways. As a matter of fact, the securing of grade separation at reasonable cost has been a very important

with the Montreal Harbor Commissioners' tracks. For economic and topographic reasons this point was chosen as the starting point for the transcontinental line. It runs thence northwest and then west, skirting in a rough semi-circle the high plateau at the base of the mountain on which much of the city is built. At 10 miles it passes under the Canadian Pacific Ry.

Half a mile further is the point of connection with the local line which will tunnel directly through Mount Royal (at its highest point) to reach the extensive

passenger and freight terminals which have been laid out in the heart of the city, as mentioned above. Two miles beyond, at Cartierville, 600 acres have been reserved for a divisional yard, with repair and erecting shops, and with a margin to be devoted to workmen's dwellings, etc. The Montreal terminal system (with its great tunnel) and the Cartierville yard are shown in fig. 3.

The line now skirts the banks of the Riviere des Prairies, one of the mouths of the Ottawa, for some six miles to mile 20, where it crosses to Isle Jesus and then skirts the east bank to mile 22, where it crosses another channel (the Riviere des Mille Isles) and reaches the mainland near St. Eustache. The line now runs as straight as the topography will allow to Grenville, where it joins the existing line of the C.N.Q.R., and crosses the Ottawa with it on a fine steel bridge, 2,000 ft. long, to Hawkesbury at mile 60. It then skirts the bank of the Ottawa for nearly 50 miles more, passing through L'Orignal and Rockland to Ottawa at mile 116. There are only two important bridges on this section, over the South Nation River and over Greens Creek near the city. Ottawa will be on a branch about a mile long to the existing Central Station.

The main line follows up the Rideau River and crosses it near mile 122. The Toronto branch leaves at this point, which has been called Rideau Jct. The main line swings away again towards the Ottawa and crosses both the C.P.R. and

The largest of these is Cedar Lake, 10 miles long. The scenery is very picturesque. The amount of agricultural land being very small, several hundred square miles of this and adjacent valleys have been set aside as a national park and game preserve. The line follows the Petawawa very closely, with heavy rock work and comparatively abrupt ascents in the canyons alternating with easier country and level grades along the lake expansions, to mile 289, where it attains an elevation of 1,100 ft. above sea level.

The rise has been almost constant, and although there are many miles of level there is very little reverse at any point. There is now, however, some four miles of descent to the crossing of the Kioskoku Lake, an expansion of the Amable du Fond River. This is one of the constructive problems of the road, being 1,200 ft. wide, with 40 ft. of water, over a not very reliable bottom of unknown depth. Eventually there will be a solid earth fill. Another divide, with an elevation of 1,140 ft., occurs at mile 306, after which there is a long descent to Lake Nipissing, at North Bay, where it is 460 ft. lower. About half of this is negotiated on a grade of 0.5%, compensated; the balance is intermittent, and nowhere more than 0.4%. At mile 339, the line again crosses the C.P.R. overhead, and at mile 344 reaches North Bay, the first town since leaving Pembroke.

Lake Nipissing to Port Arthur.

From North Bay the line parallels the C.P.R. along Lake Nipissing to mile 359,

large rivers which unite further north to form the Moose River. The country is much better and shows considerable areas of clay loam. At mile 577, the Apishkanagama (another large tributary) is crossed, and at mile 610 the Kapuskasing Lake. This again is a very attractive country, which continues across the Missinaibi at mile 632. Although the immediate surface is undulating, the general level is uniform.

At Oba, mile 686, there is one of the topographical freaks which are so common on this great plateau. A considerable stream, the Oba River, forks abruptly; part of it crosses the line and runs north into the Missinaibi, the balance turning abruptly south and after a circuitous course crossing the line at mile 696 as part of the Kabinakagami, which eventually empties into the Albany River many miles north of the Moose River. At mile 712 is another large stream, the Morrison or Shekak (hitherto not laid down on the maps), noted for the size, number and voracity of its trout. Still another large stream feeding the Albany system is the Obakamiga, at mile 740.

From this point westward the line runs into some rough Laurentian country again to mile 800, when it again emerges on to the great northern plain near Mackays Lake. It has crossed the height of land in the meantime, and crosses back again near mile 810. At mile 825 it crosses the outlet of Long Lake, known as the Kenogami River, which also swells the Albany. The lake is an extraordin-

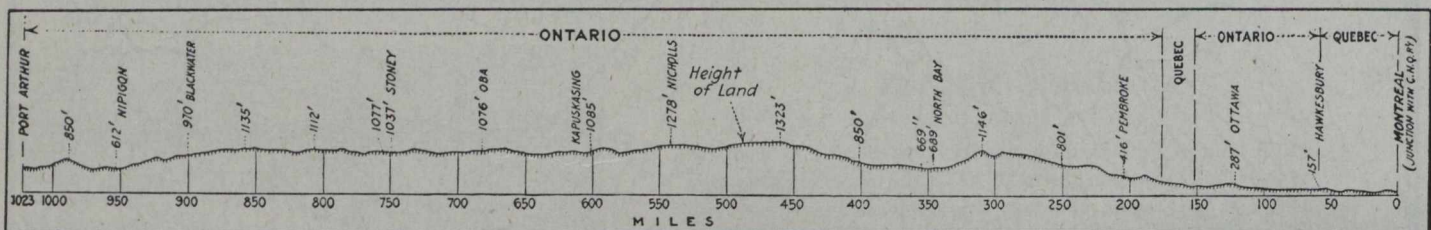


Fig. 2.—Profile of Montreal-Port Arthur Line, Canadian Northern Railway.

G.T.R. (Parry Sound branch) overhead, and after paralleling the river again for several miles crosses it at mile 154 to the Quebec side. It parallels it again for 22 miles, recrossing into Ontario near mile 176. This is the most important structure so far, necessitating a span of 300 ft. and several smaller ones. At mile 199 it again crosses the C.P.R. overhead, and at mile 206 runs into Pembroke.

So far the line has been in settled country and generally in limestone formation, following one of the great rivers of the continent for practically the entire distance. The securing of light grades has been a comparatively easy matter, but beyond this point the problem is entirely different. The line leaves the Ottawa and ascends the Indian River and almost immediately begins to rise. At mile 225, a divide is crossed which leads to the valley of the South Petawawa (another large tributary of the Ottawa) the line skirting along Grand Lake and some other expansions to mile 253. Another low divide is crossed into the valley of the Little Madawaska, down which the line runs to the main Petawawa. The work is quite moderate, but largely in rocks. The grades, after surmounting the Indian River divide, are almost level.

The Petawawa occupies a very marked depression running for over 100 miles parallel to the Ottawa. At points it narrows to the dimensions of a canyon, and again widens out sufficiently to form lake expansions two miles or more in width.

then crosses the Sturgeon River at mile 365 and follows its valley and that of one of its branches to mile 397. There it crosses another low divide into the valley of the Wahnapeite, and crossing this it skirts the south shore of the lake. At mile 427 it runs into the existing line from Toronto northward, which has been in operation for some years. This point has been named Capreol Jct.

The combined line now runs up the Vermilion valley through a country which has been proved to contain large mineral wealth. At Moose Mountain, hematite iron is being mined in considerable quantities; nickel, copper and some silver have been turned out at other points. There is also a good deal of timber being taken out at various points. The valley itself is somewhat remarkable. It cuts almost at right angles to the general strike of the country and leads up to an unusually low height of land between Lake Huron and Hudson Bay, 1,350 ft. above the sea, at an average grade of only 10 ft. per mile. This divide is so flat as to be imperceptible to the eye, and at its highest point is a spring pond in a local depression.

For 250 miles the line has been running through a country almost useless from an agricultural point of view. Where it has not been rock, it has been dry sand and gravel, but on the northern slope of the continent it begins to improve, and some of the valleys show good land and are well timbered. At mile 563, the line crosses the Ground Hog, the first of the

ary sheet of water 55 miles long, extending south to within 30 miles of Lake Superior. It formed one of the problems which the early C.P.R. survey encountered, and forced the line down to the immediate shore of Lake Superior. The effort to find some way round it or across it delayed the C.N.R. surveys over a year. At the south end it is a deep valley between high granite ridges, and the country on either side is almost inconceivably rough. At the north end, on the contrary, is a flat country in every direction, except south, and considerable areas of good land abut against it.

The Hudson's Bay Co. has had a trading post here for half a century or more, and within the last few years the French company, as it is called (Revillon Freres), has established another. Four long travelled canoe routes meet here. One from the south by the lake itself and a chain of lakes and rivers connecting it with Lake Superior near Jackfish Bay. Another starting from Lake Superior by the Pic River and Mackays Lake; a third comes in from Lake Nipigon to the west, and still another follows the Kenogami River to the Albany. This point is therefore a natural gathering place for the Indians of the country and an emporium for the fur trade. The line follows approximately the third of these routes, skirting the north shore of Little Long Lake and Wild Goose Lake.

At mile 854 it crosses the height of land for the fourth time and enters the basin of Lake Nipigon. Crossing the

Sturgeon River at mile 870, the line makes for the valley of a parallel stream, the Blackwater, which it follows to mile 900. Leaving the Blackwater about five miles above its mouth, the line turns abruptly south, and at mile 908 comes out on the immediate shore of Lake Nipigon at Sand Point. For the next 50 miles the work is generally heavy and on side hill. The line follows the bold shore of Orient Bay, and from its head follows a curious valley between lofty trap mountains, partially filled in with glacial drift, once forming the outlet of the lake. At mile 912 is the only tunnel since leaving Montreal, 1,100 ft. in length through a bold trap bluff.

200 ft. to the dividing ridge between it and Thunder Bay. Immediately after crossing this divide is the heaviest piece of permanent trestle on the line, the crossing of Blende River at mile 998. This is 1,400 ft. long and 140 ft. maximum height. From this point into Port Arthur, at mile 1,023, there is a long descent on fairly easy ground to within two miles of the city, whence it is being arranged to use the C.P.R. line to a junction with the C.N.R. line already in operation from Port Arthur westward.

Exploration and Surveys.

The surveys for this long stretch of line (1,023 miles) have extended over eight years, although most of the work

established supply routes, elevations of lakes and rivers, direction of drainage, and the character of the surface geology.

From the information gained, a general route was laid down through governing points, only one or two of which have been abandoned as the result of fuller information. This being done, the regular survey was started and carried continuously forward from either end. The methods were rather different from, and it is believed an improvement on, the usual practice. The district was divided into two parts under as many experienced division engineers, probably the very best men for the task to be found in the country. To each of these was as-

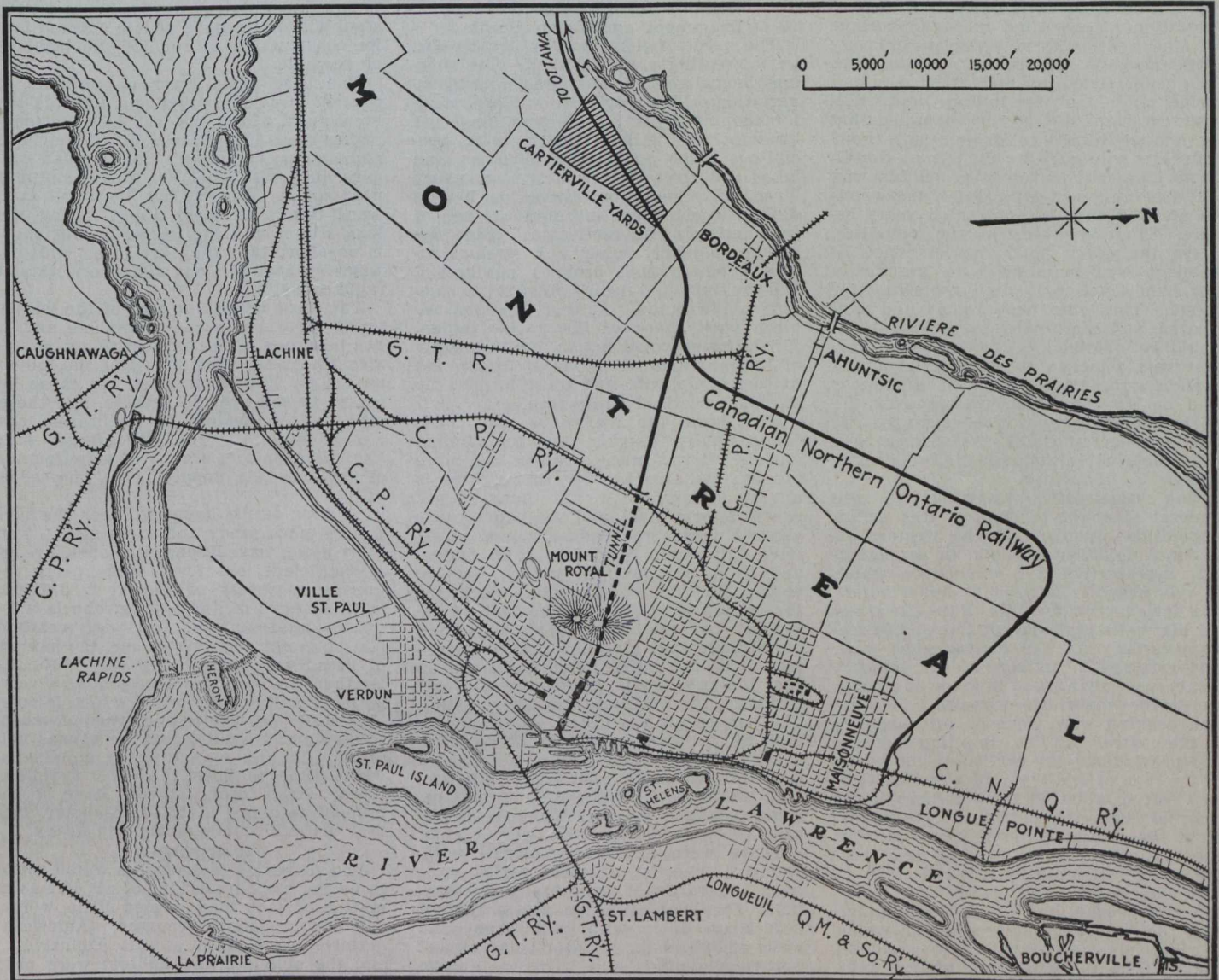


Fig. 3.—Canadian Northern Railway Terminal Lines in Montreal, with Tunnel under Mount Royal to Central Passenger Station.

The Nipigon is crossed at mile 945 and the line then follows its west bank to its mouth, crossing the C.P.R. underneath for the last time at mile 952. Just below the mouth of the river on Nipigon Bay is a piece of construction which has given some trouble and anxiety to both the C.P.R. and the C.N.R. in passing round a huge bluff 600 ft. high fronting on Nipigon Bay. The older road has the "inside" track and is partly in cut. The new one is altogether in fill and the slopes have run out into 100 ft. of water and mud. This bluff rounded, the line leaves the bay and strikes across the head of Black Bay on very easy ground, From Black Bay there is a long rise of

(and that the most difficult of access) was completed in the past four years. From Montreal to Sudbury the country was fairly well mapped and had been worked over by lumbermen. Supplies could usually be taken in by wagons within a few miles of the camps. From Capreol Jct. to Lake Nipigon, on the contrary, was almost a terra incognita. A half dozen of the main canoe routes had been traversed by the Geological Survey and laid down on the maps, their information was misleading and generally worse than useless. One whole summer and parts of other summers were spent in mere exploratory work, and rough track and micrometer surveying. These

signed two full parties, averaging from 13 to 17 men each. One of these parties ran traverses and rough exploratory lines ahead of the other and kept from 15 to 25 miles in advance of it. The other followed with trial lines and location.

The object of this was threefold. (1) The locating party should always have a knowledge of the country ahead, sufficient to prevent running into a cul-de-sac and having to back out again with much loss of time. (2) Both parties were kept on the same supply route and attended to by the same gang of packers and canoe men. (3) Both parties could be kept in touch with one another and completely

under the control of the division engineer. The plan worked on the whole remarkably well, largely on account of the personal ability and experience of the two divisional chiefs, H. T. Morrison and J. F. Rose.

The parties worked winter and summer, enough supplies being brought in during the late summer by the water routes to convenient points, at which caches were made, and from these they were distributed as required by dog teams to the various camps. These caches were placed as far as possible ahead of the work, rather than behind. The moral effect upon the spirits of the men, owing to the feeling of security thus engendered, was of marked value. As a matter of fact, there was no real privation at any time through shortage of food, practically no sickness, and very little accident. Some men mutinied at one point, tried to find their way out alone and got frostbitten and half starved; two others were drowned, but in neither case was anyone but themselves to blame. One died from the effects of alcoholic poisoning on his way in. One engineer came out of the woods to die of a disease contracted years before. These represent all the casualties.

On the other hand, the standard of comfort was maintained to practically the same level as on similar work nearer home. The tents were roomy and well heated, and the food was the best which could be obtained. A special mail carrier was attached to each division and made regular trips (by canoe in summer and on snowshoes in winter) over the 75 to 150 mile gap which separated the parties from the C.P.R. Fresh meat was often obtainable and fish almost always, except in midwinter.

One remarkable exception to the general standard of comfort was on an expedition organized by the western divisional engineer through an exceptionally inaccessible belt of country, which it was urgently desired to finish before the spring breakup. Mr. Rose discarded all his white staff except those absolutely necessary for the instrumental work and retained 17 Indians of the country. Tents were abandoned in favor of enough canvas to cover the wigwam. Heating and cooking were done on an open fire in the centre. All the camp impedimenta and provisions were carried on the backs of the men at one trip. It is sufficient to say that in spite of temperatures lower than 50° below zero, the party emerged from the woods three months later in the best of health and spirits and with the work satisfactorily finished.

In one respect the survey parties in this north land had a great advantage over the Antarctic explorers about which so much has been heard lately. Fuel and shelter from the wind were always within reach. On the other hand the light fleecy snow of the north land is incomparably more difficult to travel on than the wind swept wastes of the South Pole. And one is led to wonder whether the British sailor is after all the right man to carry through successfully such expeditions as that of Capt. Scott, and whether the north country Indian or Esquimaux, under competent leadership, is not the proper person.

The half breed runner has been known to make 100 miles in 24 hours on snowshoes. The writer had made 70 miles, and 40 to 50 miles was an ordinary day's work a generation ago. But these men were brought up to it from childhood. No man, however strong, could hope to keep pace with them unless after years of practice. They travelled with the

simplest and lightest of outfit; a rabbit skin blanket, a sheet of cotton to keep off the wind at night, a copper teakettle, a tomahawk and a frying pan. This was the outfit, and it was such men as these who accompanied Dr. Rae to the Arctic and men of a kindred race who went north with Peary to the Pole. Nansen made one of the most remarkable journeys in history, in comparative comfort, because he had studied their methods and modes of life during years of residence among them. There are still waste places on the earth to be explored and mapped, and the explorers will do well to attempt merely to improve the methods which have enabled the natives to live and thrive under the local conditions, not to revolutionize them.

Equipment and Camp Outfit.

The outfit of these survey parties was an interesting study in itself. The principal consideration, of course, was transportation. The northern wilderness is for the most part a hopeless jungle of growing and fallen timber, with precipitous rocks, swamps or muskegs, and lakes and rivers intersecting it in every direction. Continuous travel on foot is difficult and exhausting, and the use of pack animals impracticable. But the numerous lakes, ponds and streams afford good (though broken) navigation, and the universal means of travel in summer is the canoe. At first this was the birch bark canoe of the native Indian, a wonderful construction built entirely of the products of the local forest, but extremely delicate and unfit for use by any but practised white men.

Next came the basswood or cedar canoe, built roughly on the Indian models. It was much stronger and more speedy, but also heavier, and weight is a very serious matter on the portages. A still later arrival, and one coming into general use, is the canvas canoe. I believe this came originally from Maine, and it is now brought to considerable perfection. The construction, except for the canvas skin, is very like that of the Indian; but the white man's tools and metal fastenings give him a great advantage over the native, and wonderful as the Indian's work is, considering his facilities, the civilized product is better. The canoes for the C.N.R. surveys were built by the Chestnut Co., in Fredericton, N.B., but its models were rejected in favor of that of the aboriginal craft, and both models and construction were a decided advance on anything previously used.

Tents were also experimented with, and a number of different styles were tried. Here again lightness was essential. The final evolution was a roof of best 8 oz. duck, with back, front and walls of light drill. Shelter being almost always available and windage unimportant, the walls were made unusually high (5 to 6 ft.), adding much to available room inside.

Bedding for summer consisted of the inevitable woolen blankets, but in winter the extremely low temperatures render these insufficient for the ordinary man, even when made into a sleeping bag. The rabbit skin blanket is the most perfect substitute which the red man or anyone else had evolved up to a few years ago, but latterly the eiderdown quilt has superseded everything else. This, made into a sleeping bag, with a protective covering of duck, has been a very satisfactory solution of the bedding question. A well fed man can sleep comfortably in a snowbank in one of these bags with the thermometer at 30° below zero.

Transport in winter is accomplished over practically the same routes as in summer, the ice on the lakes and rivers forming the road. The toboggan takes the place of the canoe. Experiments have been tried with broad runner sleighs similar to the kometric of the Esquimaux, and under certain circumstances they are admirable. But they need a broad, open road and a fairly hard one, and this they only get on the larger lakes. The portages are too narrow and generally too soft, and the flat narrow flexible toboggan is the only thing which is universal in its adaptation. It is generally made of the native birch, and is another Indian creation which has been little improved on by the white man, although steel screws, tire bolts, and even steel wire ropes have of late entered into its construction to replace the lashings of rawhide.

The hard wood gives a minimum of friction in cold weather, but towards the breakup of winter the wet snow not only makes them difficult to haul but roughens and rags up the wood. Low wooden runners, shod with steel, are then sometimes used as an adjunct, but they are awkward things to carry about during the long winter and the period of wet snow is so short that they are often omitted. Dogs are used for long distance work and rapid travelling.

The most important part of the winter outfit is probably the snowshoe, and it has been one of the hardest to get of serviceable make. The snowshoe the Indian makes for himself is good, but those he makes to sell are the reverse, and those sold by the dealers in civilization are almost useless. The Fredericton firm has taken up this branch of manufacture of late, and is supplying a very good article.

Cooking outfits have also been the subject of much study and experiment. For light flying expeditions, the open fire is all sufficient, but for a large party requiring a variety of food it is difficult in these days to find a cook who is willing to operate on one. In stormy weather his job is not an enviable one, the baking of bread especially being very difficult. Further, the open fire necessitates a very large quantity of dry wood, which is only obtainable anywhere by virtue of much chopping and hauling and sometimes not at all. In any case it takes a helper's whole time to keep the cook supplied. Sheet steel cook stoves have been brought to a fair state of efficiency, but they are still cumbersome and heavy.

Instruments.

The surveying instruments would seem to be the most important of all, but as a matter of fact they caused little worry and few accidents occurred. American patterns were used almost exclusively, and the simplest and lightest were preferred. One of the worst faults with the smaller instruments was the small diameter of the milled head of the leveling and clamp screws, necessitating the removal of the mitten for every adjustment. Stadia wires or a gradiometer attachment for the measurement of distances were essential, in fact much of the exploratory work was carried on by micrometer work. A vertical arc on the other hand was worse than useless, merely so much more weight to be carried.

The dumpy level was the favorite on account of the greater need for ample light than for great magnifying power. For one reason or another long sights in thick woods are seldom possible in any case, and in midwinter in these latitudes the day is only eight hours long

and it is important to use the last vestige of daylight. A pole rod, self reading, with figures painted on the wood was used almost invariably. The telescope rods were apt to play tricks, slipping down unnoticed at times and refusing to extend when required.

Repairs were difficult to make, and as a matter of fact this question of repairs with the elementary tools which could be carried (the axe, spokeshave, auger and awl) was one that entered into consideration with almost every article of the equipment.—Engineering News.

concrete overlaid with a 1½ in. layer of special grease resisting mastic asphalt. The heating of all but the locomotive and boiler shop will be by direct radiation, the locomotive and boiler shop having an indirect fan system.

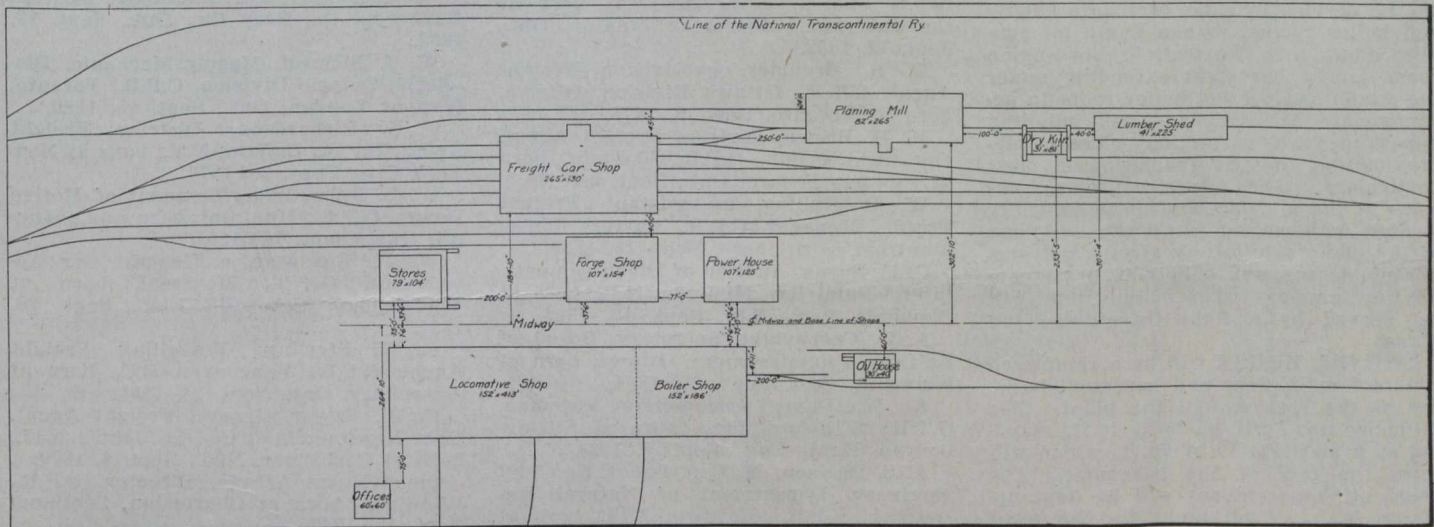
National Transcontinental Railway Shops at Quebec.

The plans for the shops to be built by the National Transcontinental Ry. at Quebec, Que., estimated to cost \$1,500,000, have recently been prepared and tenders will shortly be invited for the work. They are intended to handle all the repairs on the eastern end of the N. T.R. in conjunction with the larger shops at Transcona, Man., 5 miles east of Winnipeg, the major portion of which has been in operation for some time. A description of the latter, dealing with each of the locomotive department buildings in detail, appeared in Canadian Railway and Marine World for Feb., 1912. These two shops will handle the whole 1,800 miles of the N.T.R. from Moncton to Winnipeg, and in addition, it is the intention to handle the repairs on the G.

years to come, is considerably smaller than that at Transcona, but the layout and grouping is such that additions to present buildings, and additional buildings, may be made at any time without destroying the utility of the present arrangement.

The shop buildings will be arranged along a midway, which will parallel the main line, the relation of the buildings to the midway being somewhat different from that in the generally accepted midway shop arrangement in which the shops are placed end on the midway, with each of the buildings close together, with room for expansion to the rear. In this layout the arrangement is different, involving the location of the buildings which use the heavier ma-

THE LOCOMOTIVE AND BOILER Shop Building will be 603 by 152 ft., containing both locomotive and boiler departments in opposite ends, there being no divisional walls in the length of the building. The building will be divided into three bays, extending the length of the shop, and divided into 26 traverse bays at 23 ft. centres. Of these traverse bays, 18 will contain locomotive pits, leaving 8 traverse bays for the boiler shop. The longitudinal bays will be as follows:—Erecting bay, 75 ft. wide; large machine bay, 55 ft.; and small machine bay, 18½ ft. Over the small machine tool bay there will be a gallery extending the length of the shop, containing the lighter equipment and heating plants. The locomotive shop space will give an area of 3,400 sq. ft. of floor area per pit, which is slightly smaller than that of the Transcona shops. These shops being smaller will probably not average as heavy repairs as the western shops near the centre of the combined system.



Layout of Shop Buildings at Quebec National Transcontinental Railway.

T.P.R. lines west of Winnipeg, until such time as it becomes necessary for that line to build additional shops further west, as the C.P.R. has recently done at Calgary.

The shops at Quebec will be located in the suburb of St. Malo, which is about 2 miles distant from the centre of the city and almost due west. From the north end of the Quebec bridge, now under construction for the N.T.R., the line follows a northwesterly direction along the St. Lawrence River to Wolfe's Cove, piercing the escarpment at this point, the tunnel running straight back from the river, coming out near the site of the projected shops at St. Malo. The C.P.R. Quebec-Montreal branch passes through St. Malo, and the N.T.R. line from near the point where it leaves the tunnel, forms a Y in two directions to make connection with the C.P.R. The shops will be located on the southerly of the Y branches, in the track engirdled area, the shop area being about 1½ miles long by ¾ mile wide, the main line running along one side.

The arrangement of the buildings is shown in the accompanying plan, from which it will be noted that the layout, while providing for ample accommodation for meeting all requirements for many

materials along the midway, with the other buildings back from it. It is considered that this arrangement will prove most satisfactory for a small shop such as this, because the material brought to the shop by the midway crane and placed at one of the several doors of the building, will be taken from the door to the machines in the most direct way. In this respect, it will do away with the "long haul" in the shop. The midway, which will extend the full length of the main part of the shop grounds, will be 75 ft. wide, and served by a 20 ton travelling crane, the track for which will be supported on building abutments and steel columns.

The level of the ground on which the shops will stand is to be raised slightly by spreading over the surface the material removed from the tunnel under the mountain. Most of the buildings in the group will be of practically the same construction, a self supporting steel frame with white brick superstructure walls, the whole supported on a concrete wall carried up to the window sills. The roof of each building will be of double wood sheathing, with ventilators and skylight, and covered with a prepared roofing. The flooring in all cases, save where specially excepted, will be of 6 in.

The floor area per pit when compared with many other shops, shows that there is ample provision for future needs, and the shop will not soon become encumbered with material and locomotive parts.

The relation of the locomotive and boiler shop building to the midway will be rather unusual, being located with the long side to the midway instead of the usual end on arrangement. This layout is the result of careful consideration, which counselled this arrangement in order that all parts of the shop would be convenient to the midway, for the crane in the latter to bring parts from the stores and other buildings into the shop without disturbing the interior working of the shop as frequently occurs when material must be handled the full shop length. The material can be taken in through doors located at intervals along the midway side. Along the other side of the shop there will be two entry doors to the locomotive shop, and one to the boiler shop, for the entry of locomotives and tenders. In the erecting bay of the locomotive shop there is to be a 120 ton travelling crane for placing the locomotives on their respective pits. There will be in addition, two 10 ton cranes. The boiler shop will have a 20 ton crane, as

well as additional smaller cranes not decided on as yet.

THE SHOP OFFICES will be located in a three story and basement building 60 ft. square, near the end of the locomotive shop, and back from it. All the shop officials will be located in this one building, dispensing with minor shop offices. This building will differ slightly from the others, but will be similar in the main, of brick construction on concrete foundations.

THE STORES BUILDING will be of reinforced concrete throughout, 104 by 79 ft., flush with the midway, and with a 10 ft. platform extending around three sides, with ramps leading up from the ground level on the platform at two of the corners. It will also contain a basement. The platform on the midway side will be served by a 20 ton midway crane, facilitating the delivery of stores to and from the different units of the plant.

THE FORGE SHOP is a building 155 by 107 ft., of the typical construction, except that the flooring is to be cinder instead of dressed concrete, as is usual in forge shop practice. It will contain the usual complement of forges, hammers, etc. The steel work of the roof is designed to support the jib cranes.

THE POWER HOUSE will be 125 by 107 ft., divided by a fire wall into engine and boiler rooms, with a pump pit running along this fire wall in the engine room, and a basement extending under the whole area of the boiler room to accommodate the coal and ash handling apparatus, a construction closely approximating that at Transcona in most particulars. The power house will be close to the midway, and quite centrally located with regard to all the buildings of the plant, minimizing electrical transmission losses, and supplying dry steam for the hammers. The engine room will be served by a light travelling hand crane.

THE OIL HOUSE will be a reinforced concrete main floor and basement building at the rear end of the plant. The oil house itself will be 30 by 40 ft., standing on a platform 50 by 70 ft., which will form the roof of the basement. The usual oil house stores will be kept upstairs, with the oil tanks for the plant located in the basement.

THE FREIGHT CAR SHOP, 265 by 130 ft., will be the principal of the car department buildings. In common with the other purely car department buildings, it will be located back from the midway, with the buildings used in common with the locomotive department, such as forge shop and power house, centrally located between. It will be divided into three bays, two of which will be served by cranes. There will be six through repair tracks, with rip track accommodation at each end, where future extensions may be made.

THE PLANING MILL, 82 by 265 ft., will be conveniently located to the rear of the freight car shop. It will be but a short distance across from the power house, to which the mill shavings will be forced under a fan system.

THE DRY KILN, to the rear of the planing mill, will be 38 by 71 ft., of the usual construction.

THE LUMBER SHED, 40 by 225 ft., will be of wooden frame construction on concrete foundations. It will be noticed in connection with the four buildings of the car department that they are so arranged as to give a continuous forward movement of the lumber from the lumber shed, through the dry kiln and planing mill to the freight car shop. The latter is also to be used as a passenger

car shop. There will thus be no retrograde movements of the material in passing through the plant.

The whole layout of the Quebec shops, as well as the detail design of the individual buildings, have been prepared under the supervision of W. J. Press, Mechanical Engineer, N.T.R., to whom we are indebted for the data for this article.

Birthdays of Transportation Men in September.

Many happy returns of the day to:—

G. W. Alexander, Local Treasurer, G.T.R. Western Lines, Detroit, Mich., born at Lightcliff, Yorks., Eng., Sept. 10, 1859.

H. Bailey, Bridge and Building Master, Dominion Atlantic Ry., Yarmouth, N.S., born at Huntsville, Ont., Sept. 2, 1879.

W. B. Bamford, Division Freight Agent, Atlantic Division, C.P.R., St. John, N.B., born at Belleville, Ont., Sept. 10, 1863.

G. T. Bell, Passenger Traffic Manager, G.T.R. and G.T.P.R., Montreal, born there, Sept. 7, 1861.

W. H. Biggar, K.C., General Counsel, G.T.R. and G.T.P.R., Montreal, born at the Carrying Place, near Trenton, Ont., Sept. 19, 1852.

E. R. Bremner, ex-Division Freight Agent, G.T.R., Ottawa Division, Ottawa, born at Toronto, Sept. 9, 1875.

M. H. Brown, Division Freight Agent, Ontario Division, C.P.R., Toronto, born at Victoria Square, Ont., Sept. 2, 1866.

W. B. Bulling, ex-Assistant Freight Traffic Manager, C.P.R. Eastern Lines, Montreal, born there, Sept. 16, 1858.

C. F. Burns, Auditor of Disbursements, Intercolonial Ry., Moncton, N.B., born at Clements Port, N.S., Sept. 10, 1854.

A. D. Cartwright, Secretary, Board of Railway Commissioners, Ottawa, born at Kingston, Ont., Sept. 20, 1864.

A. W. Davis, Locomotive Foreman, G.T.R., Stratford, Ont., born at Sittingbourne, Kent, Eng., Sept. 5, 1854.

A. S. Dawson, M. Can. Soc. C.E., Chief Engineer, Department of Natural Resources, C.P.R., Calgary, Alta., born at Pictou, N.S., Sept. 6, 1871.

O. L. Dickeson, President, White Pass and Yukon Route, Vancouver, B.C., born at Ottumwa, Ia., Sept. 16, 1877.

M. B. Dube, General Foreman, Transcona Shops, G.T. Pacific Ry., Transcona, Man., born at Quebec, Que., Sept. 6, 1877.

W. E. Duperow, General Agent, Passenger Department, Grand Trunk Pacific Ry., Vancouver, B.C., born at Stratford, Ont., Sept. 4, 1872.

W. H. Estano, Traffic Auditor, Intercolonial Ry., Moncton, N.B., born at Halifax, N.S., Sept. 29, 1874.

C. B. Foster, Assistant Passenger Traffic Manager, Eastern Lines, C.P.R., Montreal, born at Kingston, N.B., Sept. 30, 1871.

J. P. Ferguson, representing Galena Signal Oil Co., Ottawa, Ont., born at Drummondville, Que., Sept. 12, 1856.

John Gray, General Agent, G.T.R., Toronto, born at River Beaudette, Que., Sept. 28, 1863.

D. W. Hatch, Travelling Agent, Atchison, Topeka and Sante Fe Ry., Montreal, born at Bedford, Que., Sept. 1, 1841.

W. R. Howard, Chief Dispatcher and Trainmaster, District 1, Atlantic Division, C.P.R., Brownville Jct., Me., born at St. Andrews, N.B., Sept. 14, 1871.

J. E. Hutcheson, General Manager, Montreal Tramways Co., Montreal, born

at Brockville, Ont., Sept. 15, 1858.

C. B. King, Manager, London St. Ry., London, Ont., born at Galena, Ind., Sept. 12, 1871.

E. L. Landorff, Resident Engineer, C. P.R., Brandon, Man., born at Copenhagen, Denmark, Sept. 9, 1888.

R. E. Larmour, Division Freight Agent, British Columbia Division, C.P.R., Vancouver, born at Brantford, Ont., Sept. 26, 1868.

H. D. Lumsden, M. Can. Soc. C.E., engineering department, C.P.R., Toronto, born at Belhaire, Scotland, Sept. 7, 1844.

F. J. Mahon, Superintendent Telegraphs, Eastern Division, C.P.R., Montreal, born there, Sept. 18, 1865.

R. E. Merkley, Trainmaster, District 3, Saskatchewan Division, C.P.R., Saskatoon, born at Ottawa, Sept. 3, 1882.

J. F. Mundie, City Freight Agent, C. P.R., Montreal, born at Prescott, Ont., Sept. 20, 1857.

M. B. Murphy, Superintendent, District 2, Central Division, Canadian Northern Ry., Winnipeg, born at Napa, Cal., Sept. 11, 1866.

B. S. Murray, Route Agent, Canadian Express Co., London, Ont., born at Glenwood, N.Y., Sept. 17, 1856.

J. Paul, District Freight Agent, Canadian Northern Ry., Winnipeg, born in Euphrasia tp., Grey Co., Ont., Sept. 13, 1858.

W. J. Pickrell, Master Mechanic, District 3, Ontario Division, C.P.R., Toronto, born at London, Ont., Sept. 15, 1880.

C. S. Richardson, District Freight Agent, C.P.R., Buffalo, N.Y., born at New York City, Sept. 26, 1870.

W. D. Robb, Superintendent of Motive Power, G.T.R., Montreal, born at Longueuil, Que., Sept. 21, 1857.

W. H. Rosevear, ex-General Car Accountant, G.T.R., Montreal, born at Wadebridge, Cornwall, Eng., Sept. 26, 1837.

F. W. Sterling, Travelling Freight Agent, C.P.R., Vancouver, B.C., born at Thornbury, Ont., Sept. 14, 1881.

E. W. Taylor, General Freight Agent, Reid Newfoundland Co., St. John's Nfld., born at Carbonear, Nfld., Sept. 8, 1870.

Sir William Whyte, Director, C.P.R., Winnipeg, born at Charleston, Scotland, Sept. 15, 1843.

H. A. Young, Traffic Manager, Canadian Lake Line, Toronto, born at Brooklyn, N.Y., Sept. 1, 1864.

The Dunsmuir Colliery Litigation.—It is understood that both Mackenzie, Mann & Co., Ltd., and James Dunsmuir will appeal against the decision given by the British Columbia Court of Appeals in the cross actions arising out of the sale by the latter of the colliery properties and effects of the Dunsmuir estate on Vancouver Island. The court found that Mackenzie, Mann & Co. were entitled to receive from the vendor all the seagoing vessels engaged in transporting the coal, except the ship Oregon; the stock fuel at the C.P.R. bunkers at Vancouver, B.C., and other collateral properties, and that the vendor is entitled to all the earnings of the properties up to the payment of the purchase money, and not up to the date of the option, as claimed by the purchasers.

In the operation of steam railways throughout the Dominion, during June, there were 24 fatal and 89 non fatal accidents. Of the fatalities, 7 were due to being run over by trains; 4 each to being crushed between cars, to falling from trains, and to being struck by falling material; 3 to being struck by trains, and one each to a derailment and to being crushed by an elevator.

North Toronto Grade Separation, Canadian Pacific Railway.

The C.P.R. is carrying out the grade separation work on its line across the northern part of Toronto, in compliance with the Board of Railway Commissioners order, which called for the elevation of its tracks as well as those of the Canadian Northern Ontario Ry. line, which is projected to enter Toronto from the west along a route following that of the C.P.R. most of the way through that portion of the city. This order called for the elevation of all through tracks from Dufferin St. on the west to Summerhill Ave. on the east, with subways for the majority of the streets crossed. The constructional work is being conducted by the C.P.R., the C.N.O.R. and the city sharing equally in the cost with the C.P.R.

The C.P.R.'s North Toronto line was formerly owned by the Ontario and Que-

bec Ry., which was absorbed by the C.P.R. in the 'eighties. Originally, this was the only entrance the C.P.R. had to Toronto, but some years ago a diversion was made from Leaside Jct., about two miles east of the centre of the city, to the line across the city waterfront, and thence into the Union Station. This, in conjunction with the C.P.R.'s Toronto, Grey and Bruce line, sidetracked the North Toronto line, the trains entering the Union Station from the east by way of Leaside Jct., and from the west by way of West Toronto. The North Toronto line was afterwards used for freight purposes, a noncongested cut off for through freight being thereby obtained. As the C.N.O.R.'s new line will also enter the north end of the city, the possibility of considerable traffic being handled across the double line made it appear advisable in the Board's opinion to elevate the tracks through the central portion of the

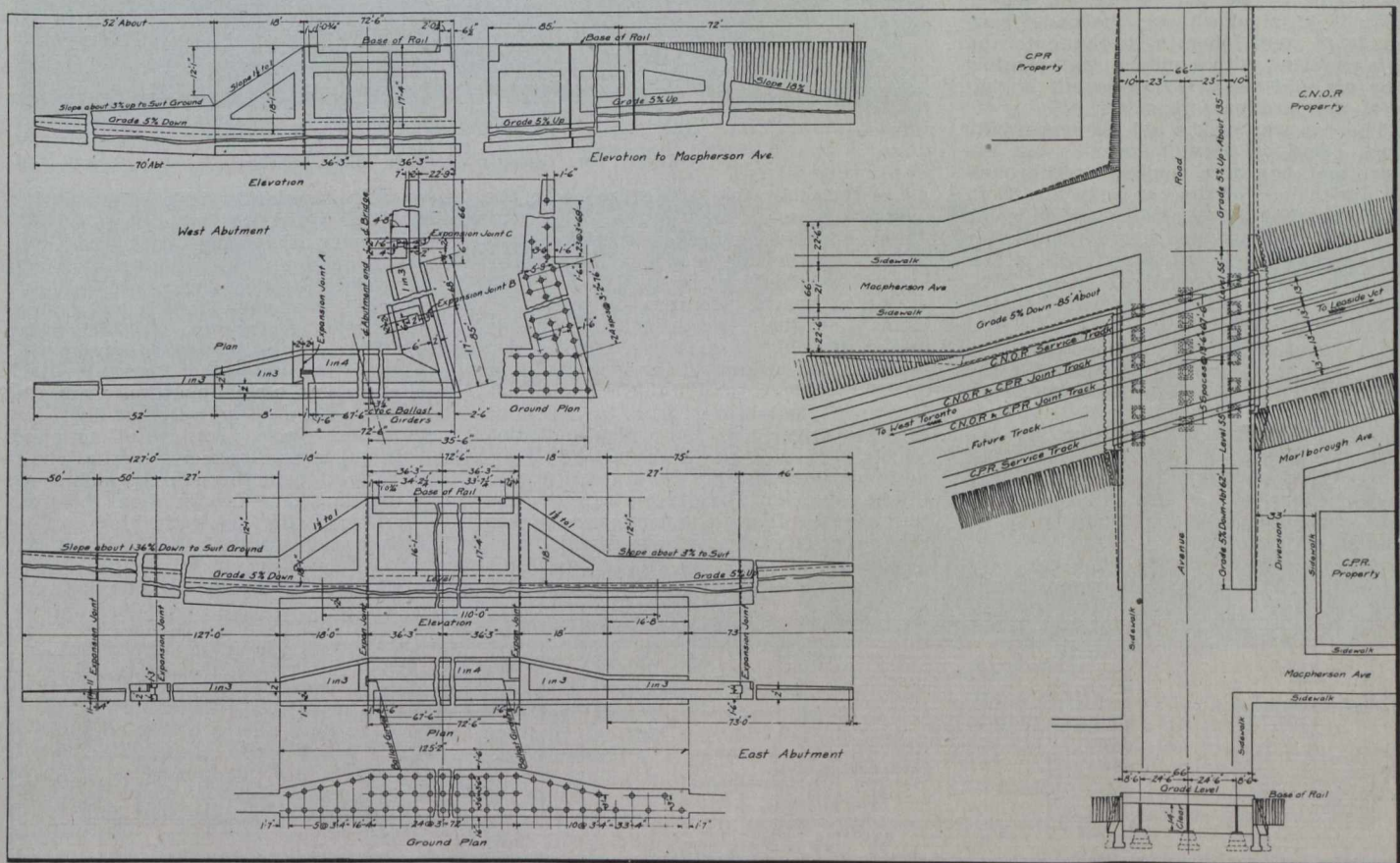
line, work on which is now under way. The viaduct is to be built for 5 tracks, and will be about 3 miles long, covering the more congested portion of the route. Of these five tracks, the northerly one will be used as a service track by the C.N.O.R., as that line connects at both ends with the C.P.R. route from the north. The southerly one will be for C.P.R. service. Of the three central tracks, the two northerly are to be built at present, and will be used jointly for through service. The fifth track will not be built at present, but provision is made for laying it as occasion may require.

To date, only one subway has been built, that at Avenue Road, which is shown in the accompanying illustration. The others will be proceeded with as ordered, the headway clearance of all but this completed subway being as yet under

The elevation work between subways has been carried forward in a similar manner, leaving the southerly track open at grade, building a trestle on the north side, on which traffic was diverted. The portion that has so far been elevated is the section from Summerhill Ave. to near Davenport Road, including Yonge St. crossing, which is now being carried on a temporary timber trestle, pending a settlement in the clearance dispute. The two northerly tracks are completed, and the others are being pushed forward. On this section, the elevation is about 12 ft. above the former grade.

It is expected that the new Union Station for the C.P.R. and C.N.O.R. will be in this portion of the line, on the east side of Yonge St., but no definite decision has been announced.

The next subway to be built will be at Davenport Road, where two streets—Davenport Road and Poplar Plains Road—will be carried under the tracks in one



Avenue Road Subway, North Toronto Grade Separation.

consideration, the city demanding greater head room than the railways feel prepared to give. The Avenue Road subway is 66 ft. wide, with a roadway clearance of 14 ft. It is of a concrete substructure construction, with the former street level depressed about 5 ft. Macpherson Ave. enters the subway from the west on the north of the tracks, requiring a slight street diversion, with retaining wall along that side. All street approaches are on a 5% grade. The subway is crossed on steel plate girders. Work on this subway was carried forward without interruption to train service by leaving one track at grade and building the concrete abutments on both sides of this track, finally carrying the service across on a trestle bridge at the new elevation, and building in the open space in the abutments. The street traffic was diverted to the east on the Marlborough Ave. side.

subway, by forming a T entrance from the north, the two streets uniting at the tracks. Subways are projected, in addition to the three mentioned, at Spadina Road, Howland Ave., Bathurst St., Christie St., Shaw St., Ossington Ave., and Davenport Road. These are all to the west of the semi completed portion. The elevation work is being carried out under A. L. Hertzberg, M. Can. Soc. C.E., Division Engineer, Ontario Division, with B. Ripley, M. Can. Soc. C.E., Engineer of Grade Separation, directly in charge.

The question of introducing on the C.P.R. Eastern Lines, the unit system of organization for the general superintendents and superintendents offices which has been in force on the Western Lines for some time, is said to be under consideration.

Canadian Northern Ontario Railway Supply Car.

Early this year, the C.N.O.R. placed in service a new supply car, which is illustrated herewith. The car is an old Pullman sleeping car, rebuilt under the direction of A. L. Graburn, Mechanical Engineer, to designs evolved in conjunction with L. C. Thomson, Storekeeper, embodying a number of new features that have appeared desirable to the latter through his long familiarity with store cars, both on the C.N.R. and the C.P.R.

The fact that the car is a piece of passenger equipment, discarded, not on account of being unserviceable, but rather from the fact that for present day equipment it was a little antiquated, made a splendid base on which to construct the store car. While but little of the old body remains, the underframing, car framing, and trucks have been utilized, the whole making for a very solid car. The trucks are six wheel, with 36 in. steel wheels; the underframing is of steel I beams throughout; and it is provided with standard draft rigging. The air and signal arrangement is that of a standard passenger car.

The car was of the old open vestibule type. One of these vestibules, on the store end, has been removed. The overall dimensions of the car body are 66 ft. 2 ins. long, by 9½ ft. wide. As refinished, the window arrangement of the former sleeper has been rearranged with a few higher windows along both sides. The finish of the car corresponds to the C.N.R. standard.

The open vestibule end is the living and business end of the car. To the right on entering from that end is a double berth section for the attendant in charge. Opposite this section, in the corresponding length of the car—6¼ ft.—are three sections, two of which are shelf lockers, with a heater room alongside, containing a Baker heater with its auxiliary apparatus.

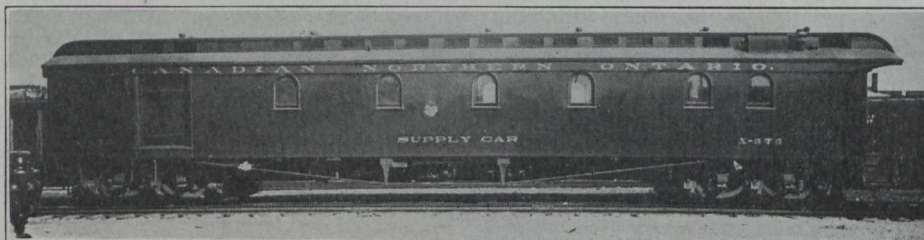
Beyond this section of the car is a room 10 ft. 2½ ins. long, designed for the

on each side of a central aisle. These sections are of different shapes and sizes, to accommodate to the best advantage the full range of stores carried. The first section at entering on the right is a set of four vertical compartments above and below, opening into the centre aisle by sliding doors. Across from this section is a double section of tiers of drawers, entered both from the office and a cross aisle. The other store sections take different shape, all opening from the cross aisles with the exception of the end section on the left, which has sliding doors from the centre aisle. The two sections opening on the centre aisle was

the stations, nobody but the attendant being allowed in the car, he thereby having a closer check on all the stores. The practice in service is to have the stores for delivery at a certain station made up on the run and piled opposite the delivery door ready for serving out without delay. For safety, there is a 1 in. grab iron across the door opening above the door.

The large oil tank room is also the store room for bulk stores, such as tie plugs, which can be heaped in the open spaces at the end of the room or opposite the small tanks.

The lighting is from six pairs of oil lamps suspended from the roof, spaced at even intervals down the centre of the car. There is also a side bracket lamp



Supply Car, Canadian Northern Ontario Railway.

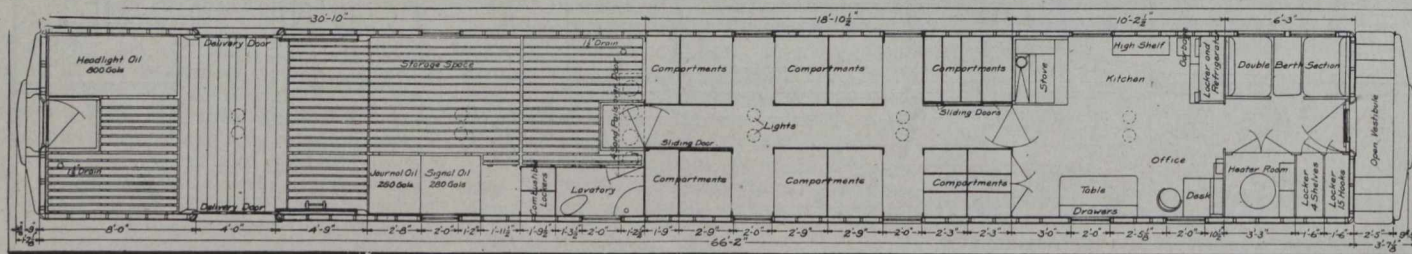
necessitated by the lack of space in the narrow cross aisles.

Beyond these storage sections, the balance of the car is a long open room, except for the lavatory on the left, and a tier of special lockers beyond the latter, for the storage of inflammable material, such as matches, fuses, etc. This section is kept under lock and key, and the interior, both walls and door, is lined with galvanized iron to minimize the fire danger. This is an idea embodied by Mr. Thomson as the result of an experience encountered some years ago in the handling of inflammable stores. The tightness of these compartments makes the possibility of fire very small.

This large room, 30 ft. 10 ins. long, contains three oil tanks, two small 280

over the attendant's desk. Fire protection is provided for by a chemical fire extinguisher above the desk, and four pails of sand on a ledge over the door leading into the oil room.

The factor of operating the car is well looked after in the design. All the oil tanks have connections on the under side of the car through which they are filled, removing that dirty operation from the body of the car. Any oil that does slop out inside the car is drained off as noted. All supplies are loaded into the car at the loading depot through the side doors and distributed to their several locations for redistribution along the line without having occasion to go into the living section of the car at all. The whole arrangement is a considerable improve-



Plan of Supply Car, Canadian Northern Ontario Railway.

attendant's general living quarters, the portion on the right forming the kitchen, and the opposite side the office. In the kitchen portion, at the entry end, is a double locker, cupboards above and refrigerator below, the front of the cupboard forming a kitchen ledge and sink. In front of this is a garbage chute to the outside of the car. The opposite end of the kitchen section contains a small kitchen range, insulated on the two wall sides and floor. The office half of the room contains at the entry end a small desk attached to the wall, with revolving desk chair in front. Over the desk are tiers of pigeon holes for the stores bills, etc. To the rear of the desk, along the side of the car, is a table 4 ft. long, used principally in wrapping up parcels for delivery at the different stations.

Beyond this double utility room, in the centre of the car, is an 18 ft. 10½ in. section containing three storage sections

gal. tanks for journal and signal oils, and the third at the very end of the room of 800 gal. capacity, for headlight oil. All these tanks are equipped with Bowers measuring and drawing apparatus. This whole room, with the exception of the strip across between the two 4 ft. sliding doors near the end of the larger tank, is laid with slatting. Under this, on the underflooring, is a surface of galvanized iron, draining to 1½ in. drain holes at each end of the room, through which all the wasted oil is drawn off from the floor of the room. This idea of slatting on the floor and surfacing underneath is one of the most valuable features of the car.

The side doors are very similar to those found in baggage cars, sliding on wheels into protected door pockets. Across between the doors, the surface is of 2 in. close flooring. All the stores are given out through these side doors at

ment on the former stores car, which was an old caboose, slightly rearranged for this particular service. Everything has been so carefully planned for convenience, that the writer is informed by Mr. Thomson that it is now the practice to frequently place the car near the head end of a passenger train, and while the train is running the order for the next station is being made up, and on arrival, everything being in readiness at the side door, it is unloaded with dispatch and the receipt for the same taken without delaying the train.

The Reid Newfoundland Co.'s employees held their first annual outing at Octagon, Aug. 23.

During June there were 14 fatal and 10 non fatal accidents on railway construction in the Dominion. Thirteen of the deaths were due to premature explosions, and one to a derailment.

Railway Transportation Problems of the Future.

By J. Grant MacGregor, M. Can. Soc. C.E., Assistant Engineer, Construction Department, C.P.R.
Red Deer, Alta.

The building of so many transcontinental lines across the Dominion, and the opening up of new inland and ocean waterways for the transportation of the produce of the country, may be regarded as the dawn of a new era in the history of railway transportation. The rapidity of the pace set by competitive lines is in a measure responsible for the state of bewilderment in which the country now finds itself when confronted with the most important railway building and transportation problems of the age. The situation has been the subject of much controversy both among members of the engineering profession and those concerned financially in the economics of present-day railway construction and operation. Precedents based on past experience in pioneer railroading have been disregarded and the researches and life work of the greatest authorities on railway economics have been found antiquated when compared with the progress of recent events. There is also a decided lack of harmony between different depart-

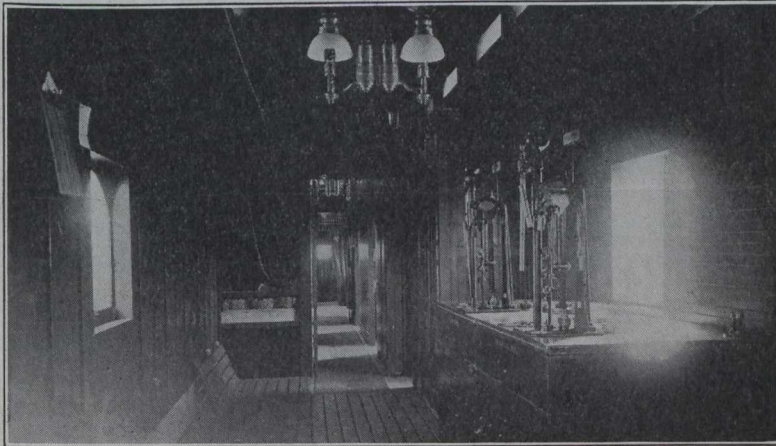
frequently is advantage taken of a new line with low grades as an accessory for the use of old or obsolete locomotives, whereby a saving can be effected to the operating department at the expense of the construction department.

If, by constructing railways with lower ruling grades, a solution is not obtained to the problem of hauling heavier train loads with present locomotive efficiency, then a step has been taken in the wrong direction, which is not at all unlikely. The solution, however, will not be found in any further development of the increased weight of the present unit of steam tractive power. More likely it shall be found where a greater number of units are used, whether of steam, electrical or oil gas propulsion, whereby the load to be hauled can be increased to a proportion consistent with the proper train unit for minimum cost of operation.

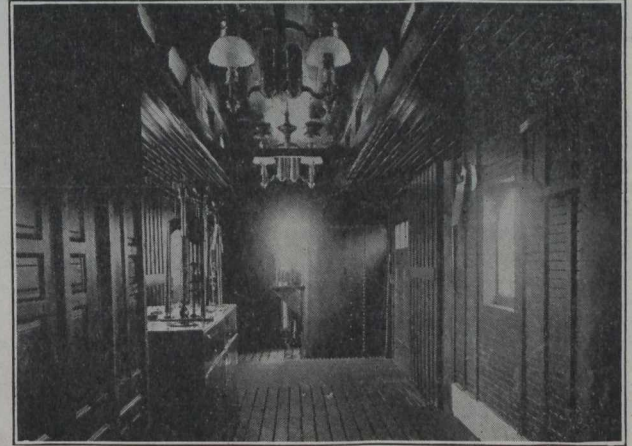
But to return to the question of the value of lower ruling grades. It should not be necessary at present to make a strong plea for their use wherever they

analysis referred to, once carefully prepared and put in graphic form, should show the performance of each class of engine between stations, with a load line adjusted to conform to the requirements of minimum speed over long stretches of ruling grade. To obtain satisfactory results, close co-operation is necessary between all departments affected.

The growth of the trade of the Dominion, affecting transportation companies, is so rapid that greater caution than ever should now be exercised in constructing new arteries of commerce. It would appear that in determining the main arteries of commerce of the future, greater consideration should be given to conditions affecting their future development, than to questions of rapid transit and shortest route under present conditions. The fact must not be overlooked, however, that there will always be a limit to the extent to which physical obstacles can be removed from a route, and for this reason it may be necessary to look for developments along other lines. Some of the sources from which relief must be expected are already to some extent receiving attention from the principal transportation companies, such as greater facilities for a more speedy and continuous flow of traffic in both directions along the main arteries, with corresponding



Supply Car Interior, looking from Oil Room towards Vestibule End.



Oil Room of Supply Car.

ments of the various railways in regard to the advantage of the present practice of building railways with long stretches of low ruling grade, all of which tend to unnerve the engineer who may have placed too much faith in the adaptability of old and well known rules to modern conditions.

The question that now arises is, To what extent are the conditions changed that require a departure from well known rules and practice in railway building? The two greatest factors that have entered into and hold sway in all problems of railway engineering and operation since the invention of steam are those of "tractive power" and "train resistance," and as long as the law of gravitation exists we shall have at least one of those to contend with. In considering the other factors, the development of steam tractive power and its application to overcoming train resistance, we find that no great strides have recently been made whereby increased efficiency in the hauling power of locomotives should bring about a change in the conditions affecting grade and alignment. Until closer co-operation is instituted between the operating and engineering departments of the various railways, very little will be accomplished in the way of building railways on a basis by which the best results can be obtained in their operation. Too

can be introduced at a reasonable cost. The fact that millions are being spent annually by the various trunk lines on grade reduction should be sufficient evidence that the movement has got beyond the experimental stage. The wisdom of such a course is apparent from the beneficial results obtained in the way of increased revenue and lower cost of operation. The changes and modifications of grade profile, designed to produce the beneficial results obtained, have invariably been based on well known rules in railway location and data obtained from experiments of the actual performance of trains under the conditions sought. If there should be any uncertainty about the continuous performance or endurance of certain classes of locomotives on long stretches of low ruling grades, the sooner the value of such a factor is taken into account the better. In the meantime, are we to assume that the defect is of a mechanical nature, and that until such time as it can be removed the grade profile should be modified to provide suitable resting places for the recuperation of the "old horse?"

Under present conditions, what is most urgently required is a more definite system of grade profile analysis, by which the proper amount of tractive power can be assigned to the requirements of each division of road to be operated. The

facilities for the better handling of freight at distribution and terminal points.

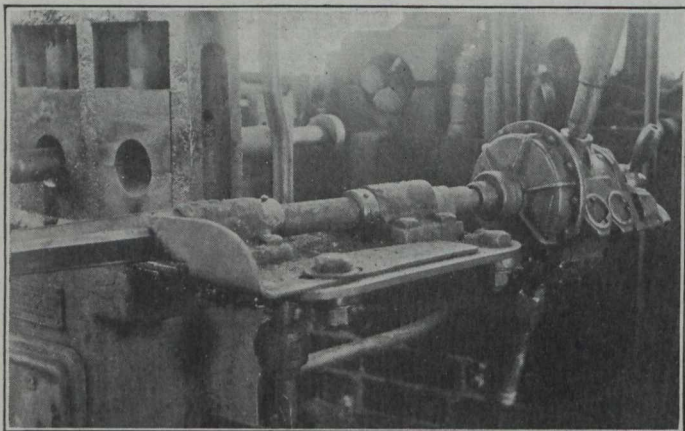
If the demand, however, for increased train loads should continue to find favor, a change in the present principle of the application of tractive power to the hauling of trains must be expected. It is to be hoped the day is not far distant when it will be found more economical to combine the power now developed by such a huge fleet of locomotives into stationary engines for the distribution of power in a manner better adapted to modern requirements, so that it shall no longer be necessary to have one or two portable power houses attached to each train, unduly wasting the products of our mines, and diffusing the sparks which destroy the combustible products of the forest and prairie.

Government Elevator at Port Arthur.— Access is to be provided for the C.P.R. and the Grand Trunk Pacific Ry. to the Dominion Government elevator at Port Arthur, Ont., by means of a spur line to be built by the C.P.R., and connecting with the Canadian Northern Ry. An order to this effect has been made by the Board of Railway Commissioners, which directs that the cost of the spur line is to be borne by the Board of Grain Commissioners.

Railway Mechanical Methods and Devices.

Tube Expander at Toronto, Hamilton and Buffalo Railway Shops.

Numerous methods of flaring the ends of boiler tubes preparatory to safe ending are in vogue at different shops, the majority employing the taper pin method, the heated end of the tube being forced by impact on the end of a taper pin, flaring the end slightly.



Rotary Tube Expanding Mandrel.

The method used in the T. H. & B. R. shops at Hamilton, Ont., W. T. Kuhn, Master Mechanic, is unique, and has some features about it that recommend the practice. Instead of the impact force alone being used for the flaring, a rotary motion of the flaring pin is employed in conjunction, the arrangement being as shown in the accompanying illustration. In addition, the taper pin resembles in some respects a taper reamer, with four equally spaced shallow flutes extending the length of the pin. The body of the pin is carried in two bearings on an elbow support from the side of an automatic air hammer, where the subsequent welding operation is performed. The rotary motion of the pin, in conjunction with the flutes, causes the tube end to spread more rapidly, producing an excellent job. The pin is driven by an air motor as shown. An adjustable stop plate on the surface of the supporting elbow gauges the depth to which the tube must be forced over the revolving pin.

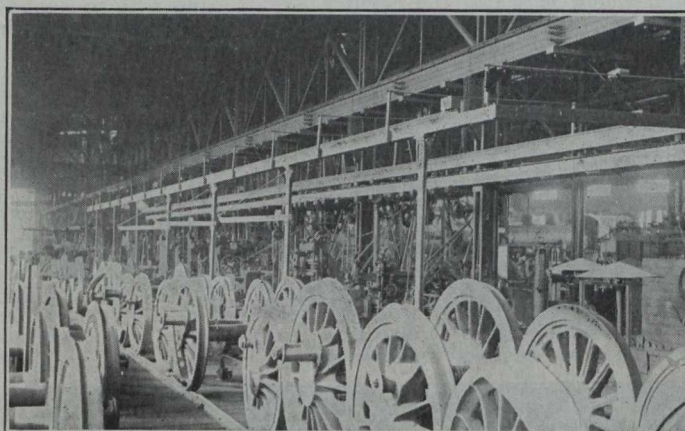
Loading Wheels at Grand Trunk Pacific Railway Shops at Rivers.

A novel method of loading mounted car wheels is used at the G.T.P.R. shops at Rivers, Man. The wheels as mounted at the wheel press in the shops are rolled out to the storage yards, where they are stored on interlocking double tracks in the conventional manner.

These storage tracks lie at right angles to the locomotive house lead track. When it is required to load a flat car with wheels for shipment to another divisional shop, the car is spotted on the lead track about 200 ft. away from the wheel storage tracks, and blocked in that position. On the storage track end of the flat car, two lengths of rail are placed, sloping up from the track rail to the car platform, and secured in place, forming a rail ramp. The wheels to be loaded are placed on the lead track opposite the storage space, and with re-

cessed end sticks several men put the wheels in motion, increasing the speed of the wheels, a pair at a time, until by the time they have reached the rail ramp up to the car, they have a considerable impetus, and run up the ramp by their own momentum on to the car. This method is very rapid, but of course is not at all economical on account of the number of workmen required. It might be found useful at small shops.

consequence is that the tool when boring in trying to swing away from the work, is prevented from so doing by the butt end of the tool being stopped by this tool rest. The fit of the tool rest block must be such as to prevent any lifting action from the tool in swinging tipping the block over on a corner. This is taken care of by making the block of such a height that the rear of the tool rests on the upper surface of the block.



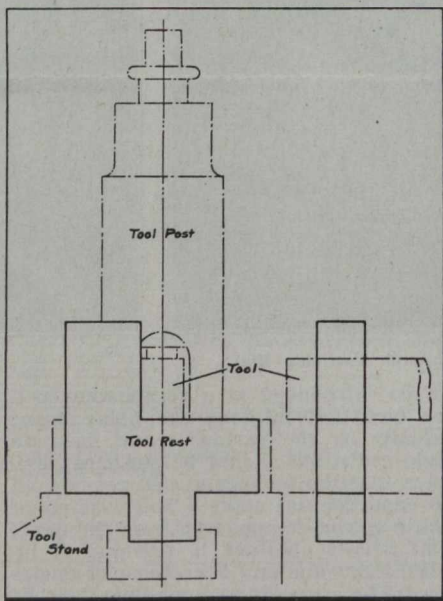
Light Crane Over Driving Box Department.

Department Crane in the Canadian Pacific Railway Winnipeg Shops

In the C.P.R. locomotive shop at Winnipeg, the driving wheel and driving box departments are located side by side in one of the side bays of the building. The driving wheels are run in on tracks, with the driving box still attached. In this location the boxes are removed.

The crane way shown in the illustration covers the length of the driving box department, a small traveller accommodating all the machines. On three of the crane supporting columns are attached small jib cranes, by which the driving boxes are swung over from the driving wheel tracks into the driving box department, where they are carried to one end, where they are thoroughly cleaned on a cleaning stand, and then taken to the different machines in the department.

The crane is of simple construction, but is a most useful adjunct in the handling of the work through the department.



Tool Rest That Insures Parallel Boring.

Lathe Tool Support at Grand Trunk Railway Stratford Shops.

For internal boring in the engine lathe, unless the cut be extremely light, the tool has a tendency to back away from the work and produce a hole tapering from the entering end. All mechanics have doubtless experienced this difficulty.

A simple expedient for the removal of all trouble from this cause is in use in the G. T. R. locomotive shops at Stratford, Ont., and is illustrated herewith. Fitting into the groove of the tool stand, and breaking up under the tool at the rear, there is a block of steel. This tool rest block has an upward projecting arm on the left against which the tool is set when fitting in the tool post. The

Air Operated Punch at Grand Trunk Railway London Shops.

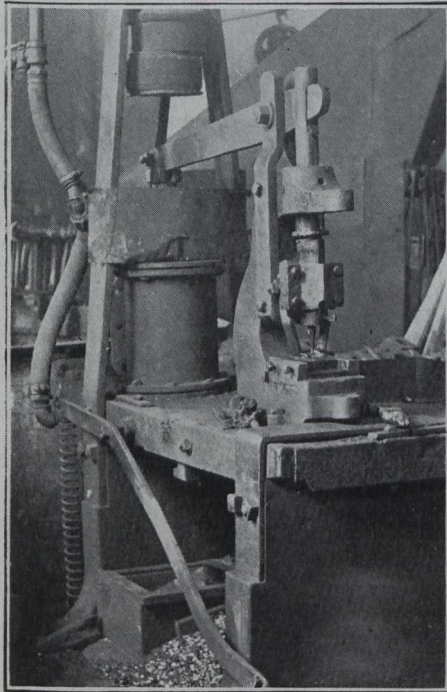
In the blacksmith shop of the G.T.R. car shops at London, Ont., of which T. Treleven is Master Car Builder, there is a small punch for piercing small holes in thin metal, the unique feature of the press being the fact that it is home made and operated by air.

On a cast iron frame, there is placed a 2½ in. plank as the illustration shows, on the rear end of which there is mounted vertically an air cylinder, bottom down. Straddling the air cylinder is a loop of ¾ x 4 in. bar iron, holding in the upper end of the loop a couple of large chunks of rubber such as are used in the Bradley hammer. These cushion the plunger of the air cylinder at the upper end of the stroke, when relieved from the

strain on the hole being pierced.

On the front end of the board base, there is a simple punch press frame guiding a vertical plunger. Just back of this plunger, there is looped band from the inner surface of the frame, carrying the fulcrum pin, on which a bar from the plunger at the rear fulcrums, being connected immediately in front to the punch plunger.

In a channel in the base of the punch frame, the dies are located, the punch lining up directly over it in the punch



Air Operated Punch Press.

press plunger, in which it is secured by a set screw.

The press is quite powerful, as may readily be surmised when it is considered that an air pressure of around 100 lbs. in a 10 in. cylinder, with the multiplication of the fulcrum arm, is used. The operation is almost the same as on any up to date punch press, the air being admitted to the cylinder by the pressing of the pedal to the left, as in a power driven machine. The blacksmiths find it of great assistance in the production of their work, where they are hampered by the lack of a large power machine.

Oil Screw Jack at Canadian Northern Railway Shops.

In the C.N.R. shops at Winnipeg, there is in use an oil screw jack, as shown in the accompanying illustration. The principal use to which it is put is in removing bolts from tight holes, such as those connecting the parts of a frame. From its small construction it can be worked in a tight corner, where there is small clearance between the bolt head and the frame.

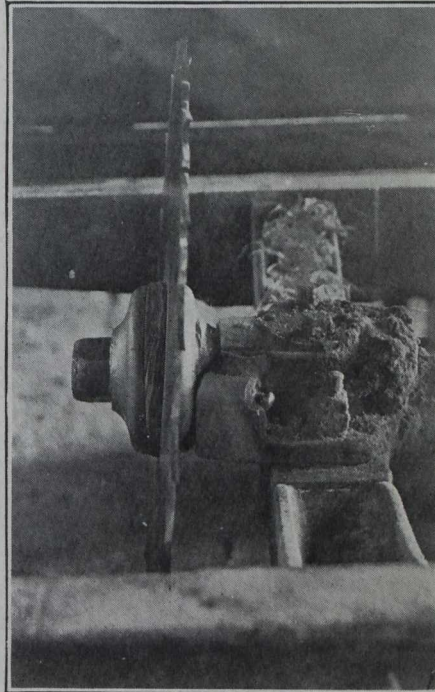
The body is of steel, bored lengthwise, and at right angles at one end. In the end of the long bore is a bushing carrying a snugly fitting 1 1/2 in. screw. The other bore contains a short 2 1/2 in. piston. The method of using is obvious. With the small diameter screw, and proportionately large lifting piston, a high pressure is possible.

For removing bolts from frames, it is a much more satisfactory medium than

that of using small cannon, a practice common in some shops, although such a course involves considerable danger to the mechanic.

Sawing Truck Bolster Truss Rod Grooves at Grand Trunk Railway Port Huron Shops.

The truss rods applied to truck bolsters pass up at an angle through the wood of the bolster and come out through the



Thin Rip Saw Set to Channel Truss Rod Grooves.

centre of the end, where the end cap, with a nut on the end of the rod, secures it in place. Instead of boring a hole diagonally through the wood from both ends, it is a more satisfactory method to remove the wood on the angle down to the path of the rod through, for the width of the rod. The truss rods being usually about 1 1/4 in. in diameter, require that the channeled cut must be at least that width. To cut this channel through the wood would require a solid cutter if cut

the saw, depending on the taper of the wooden washers.

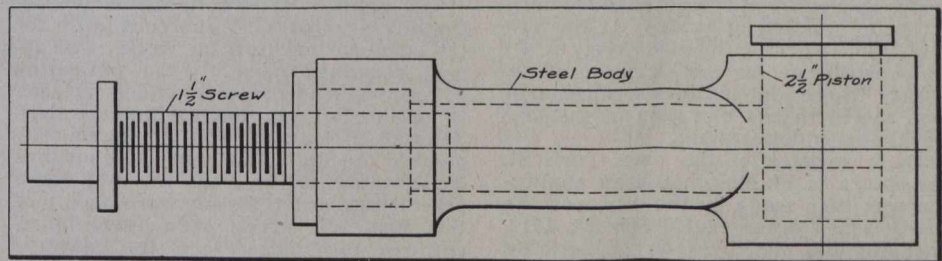
The bolster to be cut is suspended over the saw by the centre, the end resting on the saw table, the centre being raised the correct amount to give the necessary angle to the cut. When revolving, the saw presents a solid appearance as of a saw the width of the cut being made. It is most surprising to observe the rapid rate at which the saw set in this manner cuts through the wood, leaving a clean channel.

One of the first questions that arises in the mind of an observer is whether the scheme is safe, and if the strain is not sufficient to tend to cause the saw to break. Enquiry elicited the information that while this method of channeling the bolsters has been in use for a number of years, not a single accident has occurred, seeming to prove that the method is a safe one, and could be safely recommended. All the bolsters that go through these shops are slotted in this manner.

New M. C. R. Buildings at St. Thomas.

The M.C.R. is having a new locomotive repair shop and power plant built at St. Thomas, Ont. The locomotive shop is 290 by 179 ft. The construction consists of concrete foundations, brick masonry walls, steel superstructure, steel sash, cement tile roof covered with felt and pitch roofing, and creosoted wood block floors. The building has three longitudinal bays, viz., erecting bay, 72 ft. wide, accommodating 13 pit tracks; heavy machine tool bay, 60 ft. wide; and light machine tool bay, 45 ft. wide. The erecting bay is to be served by a 150 ton electric travelling crane, and the heavy machine tool bay by one of 10 ton capacity. The building will be equipped complete with hot blast heating system, modern plumbing, electric lighting and power facilities, workmen's lockers, locomotive material racks, and shop accessories.

The power plant building is 87 ft., with elevated coal trestle and storage bins 16 ft. wide along the boiler room side. The construction will be similar to the locomotive shop. The equipment will consist of four 250 h.p. boilers with chain grates, radial brick chimney, steel smoke breeching, 375 kva. engine driven alternating current generator delivering cur-



Oil Screw Jack for Forcing Out Tight Bolts.

out by the ordinary methods.

In the woodworking department of the G. T. R. shops at Port Huron, Mich., a different method is employed. Instead of a wide cutter, an ordinary thin rip saw, as shown in the illustration, is all that is required. On the saw arbor, on each side of the saw, there are tapered wooden washers, thin at one edge and thick at the other, as shown on the left of the saw. This sets the saw off at an angle with regard to the arbor, causing the saw to oscillate from side to side, sweeping out a path wider than the thickness of

rent at 575 volts, 3 phase, 25 cycle. Additional power will be supplied by the Ontario Hydro-Electric Commission.

One steam driven air compressor will be installed in the plant at present, and additional compressors later. The greater portion of the machinery and equipment has been purchased, and construction will be carried out so as to get the new plant into commission early in the winter.

The plans and specifications were prepared by the Arnold Co., Chicago, Ill., which is also doing the construction and will equip the building complete.

Railway Viaduct Along Toronto's Water Front.

After protracted negotiations, the Toronto viaduct question entered recently on what is probably its final stage prior to construction, when a draft agreement to be entered into between the city of Toronto, the Toronto Harbor Commissioners, and the Canadian Pacific and Grand Trunk Railway Companies was submitted to the City Council and approved. In submitting the agreement for consideration, G. R. Geary, Corporation Counsel, and R. C. Harris, Commissioner of Works, gave a history of the circumstances leading to its preparation, and pointed out its principal features, as follows:—

"In June, 1909, by order 7200 the Board of Railway Commissioners for Canada ordered a viaduct to be built from a point west of John St. to a point at or near Berkeley St., from the point at or near Berkeley St. on the C.P.R. right of way to Queen St., and from the same point on the Grand Trunk Railway right of way to Logan Avenue. The order, together with the plan incorporated therein, provided for the dimensions and details of construction and for the existence of three tracks on either side of the viaduct east of Church St., and the city was ordered to pay to the railway companies

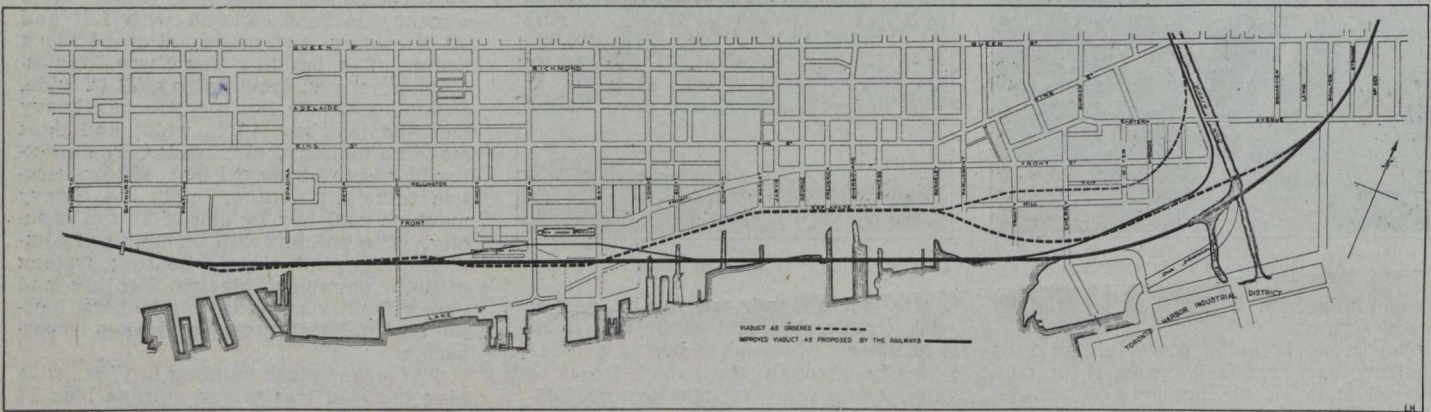
was fixed at one-third of the cost of the viaduct, as ordered by order 7200, together with such compensation (if any) as the city may be called upon to pay to the C.P.R. for lands taken for opening York St., or consequential injury or damages to the company's facilities by reason of the opening of the said street.

"In the meantime, and extending from the issue of the order in 1909, to the final judgment of the Privy Council, May 10, 1911, the question of the jurisdiction of the Railway Board to make its original order, and its right in law so to do, were taken before the Courts; but the contention of the city was finally upheld, and judgment given that the Board had jurisdiction to make the order.

"Closely allied with the construction of the viaduct is, of course, the question of the new union station. The Board ordered that plans of a new union station be submitted, and these were submitted—one by the Toronto Board of Trade, providing for a stub or terminal union station, and one by the G.T.R., providing for a station of the ordinary type, but with improvements. The plans were thoroughly discussed, and all parties interested were heard, and the Board finally by order 17034, July 18, 1912, ap-

gation into the merits of the scheme suggested by the railways. This marks the inception of the present scheme. Plans were drawn and submitted to the engineers for all parties, terms of a proposed agreement became the subject of discussion between all parties, and finally an agreement was prepared, which is before you for adoption. The plan accompanying the agreement fixes the new location of the viaduct. This agreement covers the whole situation as fully as can be. It has been arrived at after being given careful consideration, has been settled by and is approved by the Chairman of the Board.

"On the question of cost, the outstanding feature of the agreement is, that the city's share of what, for convenience sake, we may call the new viaduct, is limited to an amount which is one third of the cost which it had to pay under the old viaduct order. There are, in addition, certain items of work which were to be done in connection with the old viaduct, but which were not included in the order and plan of 1909. The cost, then, to the city is one third of the cost (composed of physical cost and damage) which the old viaduct would have caused, the city's share under the York St. pronouncement, when made, and the items just above referred to, which the Board may consider as part of the old viaduct cost.



The Viaduct to be Built Along Toronto's Water Front.

one-third of the cost:—1. Of the viaduct, the elevation of the C.P.R. coach yards and the G.T.R. Don sorting yards, and the elevation of the tracks from Berkeley St. to Queen St. and Logan Ave. respectively, excepting rails and track laying; 2. Of the erection of bridges at Eastern Ave., John St. and Spadina Ave.; 3. Of the substructure for the elevation of necessary tracks and platforms consequent upon the increased elevation of the proposed new union station.

"On a revision of the plan, York St. was shown to be closed, and an application was then made by the city, and the Board issued order 16019, Feb. 22, 1912, amending the plan by showing York St. open to Lake St., and that a subway through the elevated portion of the railway lines and tracks, and declaring that the question of compensation to be made to the C.P.R. for the lands taken, or consequential injury or damages to its facilities by reason of the opening of the said street, be reserved for further consideration. It will be seen, therefore, that the question of the opening of York St.—which had been closed many years before by agreement of the city—involves substantial questions of compensation, which are not part of the original viaduct order, and have yet to be decided upon. The cost, then, of the old order, as amended,

proved of the plan submitted by the G.T.R., and ordered immediate construction. This plan was slightly modified on a subsequent application, but in its essential principles remains intact.

"All matters, apparently, being settled, the city pressed hard and constantly for the commencement of the work. One appeal remained open to the protesting companies—the appeal provided by sect. 56 of the Railway Act to the Governor-General in Council. The city having applied to the Railway Board at its sittings in Toronto, held on Sept. 26, 1912, for a peremptory order for commencement of the work, all parties were heard in regard to the matter, and the railways finally declared that they would at once take an appeal to the Governor General in Council. A strong attempt was made to set aside the Board's order for a viaduct, the alternative proposed being that of bridges, connecting, generally speaking, Front St. with the water front. As the argument developed, it was recognized by the railways that they could not succeed on this ground, and that bridges would never be substituted for a viaduct, and they offered, as an alternative, a proposal that a different situation for a viaduct be considered. Judgment was reserved, but the Chairman of the Board of Railway Commissioners, on the same day, instituted proceedings for an investi-

"The outstanding feature as to the location of the viaduct is that it is to be built considerably to the south of the existing rights of way of the railways upon which the old viaduct was to be built. This means that, despite construction, business can be carried on as usual. The importance to the city of this arrangement will be readily seen when you realize that so great was the congestion of freight, owing to lack of accommodation in Toronto, that there was a blocking back even as far as the yards in Fort Erie and Buffalo; so great that for many weeks last year there was an embargo on freight shipped from the United States to Toronto. This caused very great disturbance of business conditions here, and how much greater would have been that disturbance can be readily realized if you contemplate the partial and, for some periods, practically total disruption of terminal facilities in Toronto extending over three years.

"Since the original viaduct order, the Toronto Harbor Commissioners have acquired the city's interests along the water front, and have engaged in the preparation of and brought to complete form plans for a great development in Ashbridge's Bay and along the water front of Toronto Bay. Naturally, being so vitally interested, the Commissioners were represented throughout these negotiations,

and have been very active in their assistance, as, of course, has been also the Board of Trade. The new location of the viaduct to the south presented an opportunity to negotiate for the acquisition of the water front, and one great advantage wrought by the present arrangement is, that through it the Toronto Harbor Commissioners become possessed of practically all the water front on Toronto Harbor. By the agreement now under consideration, the new right of way for the viaduct is to be acquired through the purchase of all the property between the existing rights of way of the railways and the Windmill Line; and, after the actual amount to be used by the railways, and a street 47½ ft. wide is set aside, the remaining portion thereof, north and south of the new viaduct, is to be turned over to the Harbor Commissioners on paying 50% of its actual cost, which means that the railway company acquires its right of way of 230 ft. in width on paying 50% of the total cost of the property referred to, that is, from the street 47½ ft. wide immediately south of the railway's right of way south to the Windmill Line, while the Harbor Commissioners get what may be said to be the preponderating balance on payment of the same amount. An alternative option is reserved to the Harbor Commis-

Tree Windbreaks on the Canadian Pacific Railway.

Trees to replace portable snow fences are being tried on a large scale by the C.P.R. Along the main line and within the district broadly defined as lying between Winnipeg, Man., and Calgary, Alta., more than 1,356,200 trees had been planted for this purpose up to Dec., 1912, by the Forestry Branch of the Natural Resources Department.

The country traversed by the C.P.R. in which this tree planting has been done is largely rolling prairie, and the frequent high winds have an unobstructed range over which to drift the winter's snow. Portable fences of a standard type have been employed to arrest the snow and prevent it from drifting into the cuts and blockading traffic. This method has the usual disadvantage of high first cost and continual repairs and maintenance.

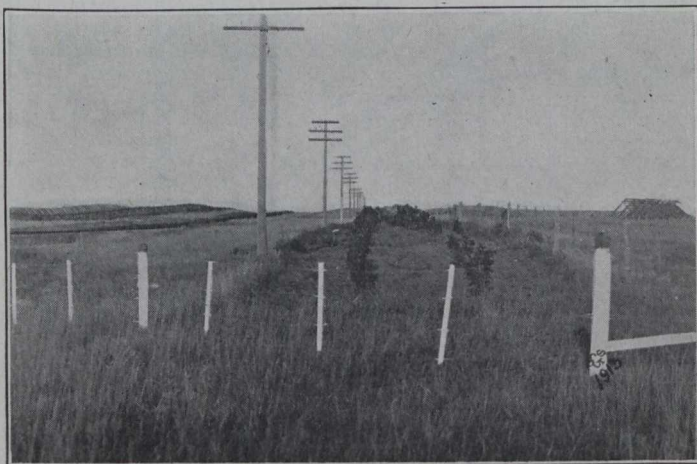
As in the case of portable snow fences, the distance of the tree windbreak from the track depends upon the topography at each point and upon the width of right of way. In general, however, the inside row is from 75 to 85 ft. from the track.

The method of planting the windbreaks may be briefly described as fol-

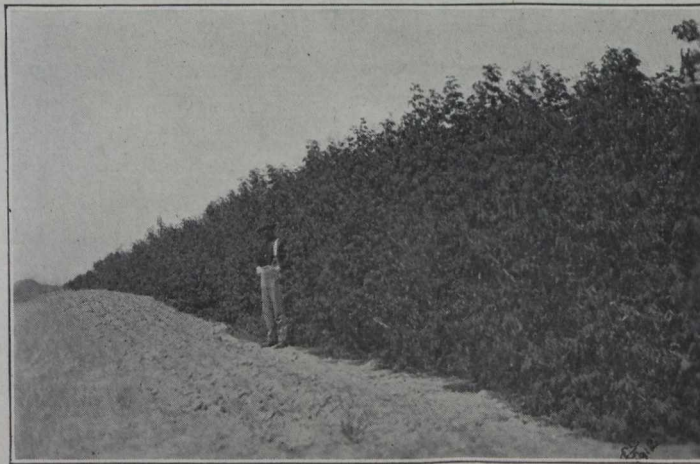
Manitoba maple, Russian poplar, cottonwood, laurel leaf willow, red willow, golden willow, ash and spruce are the species of trees which have been planted. Two species of shrubs were also planted—Caragana and Artemesia. All trees were two to three year old transplants and would vary from 24 to 36 in. in height. The loss or renewal has not exceeded 10%.

The trees have been planted 4 ft. apart in the rows and 7 to 8 ft. between rows, leaving a cultivated strip 8 ft. wide around the plantation. This reduces the cost of cultivation, as the trees quickly spread foliage and by shading the ground soon kill the weeds. With the rows 7 or 8 ft. apart there is plenty of room for a disc harrow to be worked between them, thus saving much time which would be wasted if small one-horse cultivators were used.

Two furrows have been ploughed on each side and across the ends of these plantations, thus making a fire guard of about 20 in. and a cultivated piece of more than 8 ft., or in all a strip of nearly 10 ft. in width around the plantation. Experience has shown that ground fires in that locality will not jump such a fire



Trees Just Set Out. Note Panel Fence Off Right of Way.



Tree Snow Fence, With Wide Fire Guard, near Medicine Hat, Alta.

sioners to take over all the property to the south of the new viaduct on paying one third of the total cost of acquiring the entire block from the said proposed street south to the Windmill Line, less what may be realized from the sale of that part of such block between the said street and the new viaduct.

"In connection with this plan for securing control of the water front under the viaduct order, we are advised by the Harbor Commissioners that agreements have been practically reached between the railways and the Harbor Commission by which all the property west of Yonge St. bordering on the water front is likewise to be turned over to the Commission.

"In regard to the new union station, the Chairman of the Board advises us that at the present moment experts are engaged in revising the existing plans with a view to constructing a station which will fully meet all requirements of appearance and utility, and he assures us further that actual work will be commenced at the earliest possible moment."

Railway Route Map Approved.—The Minister of Railways approved, July 30, the Lake Erie and Northern Ry. route map for revision of line between Waterford and Brantford, Ont., 10 miles.

lows: The land is broken and backset the first year, subsoiled the next, and planted the third. The planting crew consists of a foreman, 12 laborers, a cook, and two teamsters to each camp. The laborers are divided into three-man groups. In this way one man digs the holes, another places the trees in position and packs the earth firmly around their roots, and the third fills in the earth to a little above the old nursery mark, places it around the trees and levels the ground at each side of the row. This method was found to be the fastest and most satisfactory, as the foreman could then check over each group's work.

The young trees, which were grown in the C.P.R.'s nursery at Wolseley, Sask., were all baled in gunny sacks and sent by baggage or freight to the station nearest the camp. The man placed in charge of each car was supplied with two or three barrels of water, with which he kept the roots moist while in transit. As soon as the trees were received they were heeled in and after sundown distributed by wagon to each plantation, where they were again heeled in for the next day's work. When the trees were taken out next day for planting they were carried in a pail or tub containing a puddle of earth and water.

guard, or even injure plants within it.

As yet the saving in cost between portable fences and tree windbreaks is very indefinite. The trees first set out in 1908 were only high and strong enough to remove the portable fences during the fall of 1912, and owing to the light snowfall during the past winter little information as to relative value of trees and fences as snow barriers has been available to those interested.—Engineering Record.

The American Boiler Manufacturers' Association will hold its 25th annual convention at the Hollenden Hotel, Cleveland, Ohio, Sept. 1 to 4, when amongst other matters to be dealt with will be the adoption of standard and uniform boiler specifications. The entertainment committee are making special efforts for the success of the convention in view of the fact that the association, this year, celebrates its silver anniversary.

The G.T.R., it is announced, will build a larger, and more up to date elevator at Point Edward, Ont., in place of the one recently destroyed by fire. The new building will, it is said, be of steel and concrete, and be absolutely fireproof. It is probable that the old site will be utilized.

Union Stock Yards at St. Boniface, Manitoba.

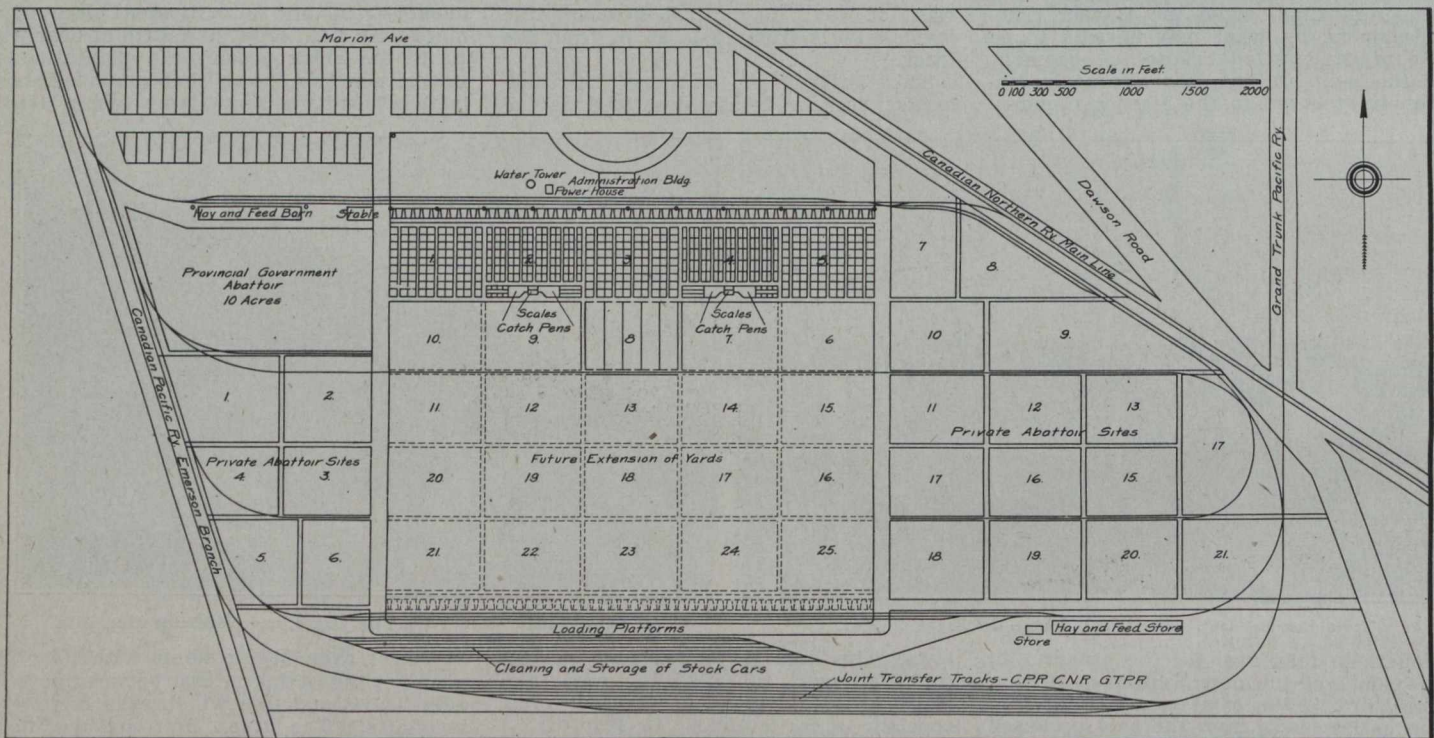
The union stock yards which have been constructed at St. Boniface, Man., have a unique organization. In 1911 the Manitoba Legislature incorporated the Public Markets, Limited, with an authorized capital of \$1,000,000 in \$100 shares and head office at Winnipeg, to establish stock yards, etc. The shareholders are limited to railway companies which enter into an agreement with the Government. Each railway company appoints one director and the Government appoints one, who, however, has no vote except in case of a tie. At present the shareholders are the C.P.R., with 334 shares; the Canadian Northern Ry., 333 shares, and the Grand Trunk Pacific Railway, 333 shares. There is provision for the control of rates and charges by the Government, but not so that 6% cannot be earned upon the capital invested. The Government also reserved the right to the first selection of a site, not exceeding 15 acres, on which it is proposed

G.T.P.R. on the east. The stock hauled to the yards by the above railways will, upon arrival at transfer tracks, be turned over to the Union Stock Yards Co.'s railway for placing at chutes for unloading. There are 50 chutes, hence 50 cars of stock may be placed at one time and unloaded without interruption. To the north of the chute tracks are two supply or storage tracks where may be held trains of stock awaiting their turn to be unloaded. The chutes open into an alley running east and west of the yards, so that as stock is moved from unloading chutes, they pass through the alley to any part of the yards to which they may be assigned. Paralleling this alley is another alley, which may be used for stock moving in the opposite direction, thus facilitating the movement in either direction without much chance of mixing it.

Just south of the chutes—bottle shaped—are blocks 1 to 5, which represent the

yards may be kept in a most sanitary condition. The troughs are also made of cement.

Opposite to and north of the chutes, occupying the middle ground between the yards and Marion Ave., stands the administration building, a handsome three story structure of rich, dark red brick, 101 by 53 ft. and 40 ft. high, finished in red oak, and when completed will contain 20 rooms or more for offices for those doing business at the yards, including the Stock Yard Company. To the west, 140 ft. from the Administration building, is the power house for furnishing water and heat to the yards and buildings. It has two large boilers, and an electric motor capable of forcing water 100 ft. high into an iron tower of 150,000 gallon capacity. From this tower water is supplied throughout the plant. The store house has not yet been built. To the west and across from the main alley of the yards is erected a comfortable, commodious brick stable, which will accommodate 15 horses, and to the west a barn covered with corrugated



Union Stock Yards, St. Boniface, Man.

sometime, either directly by the province or by some municipality with provincial assistance, to establish a public abattoir. The Government also regulates the charges, tolls, etc., in the yards.

The land on which these yards are being erected consists of 232 acres at St. Boniface, 2½ miles from the heart of Winnipeg. On the north is Marion Ave., the main thoroughfare to the Red River, which divides Winnipeg and St. Boniface; on the extreme south are the joint transfer tracks of the Canadian Pacific, Canadian Northern and Grand Trunk Pacific Railways; on the west is the C.P.R. Emerson branch, and on the east are Dawson St., which intersects Marion Ave., the C.N.R. main line and the G.T. P.R. The three trunk lines come into the yards on equal footing, each will deliver its stock at transfer tracks which pass east and west close to unloading chutes, which are situated at the extreme north of the yards proper, affording interchange of traffic between the C.P.R. on the west, and the C.N.R. and

developed pens; 6 to 25, excepting block 8, which is partially developed, represent the undeveloped land. Each block contains 2½ acres, so that the 25 blocks, approximately, contain 62½ acres. The finished pens are as follows:—Blocks one and five, 80 each or 180 open pens; block two, 98 covered pig pens; block three, 90 covered cattle pens; block four, 80 covered sheep pens, making a total of 448 pens. At the south side of blocks 2 and 4 are two brick scale houses, each equipped with the most modern scales, and adjoining the scale house is another main alley, also running east and west of the yards, which will be used as an exit for live stock. In this alley, several hundred feet apart, are six hydrants, each equipped with hose for fire protection.

One of the chief features of these yards is, that every foot of floor space, from the unloading platform, which is 8 ft. wide, including chutes, alleys and pens, are made of rough concrete, which may be flushed as required, thus the

iron, as a protection against fire. The barn is adjacent to the tracks, is 400 ft. long and will hold hundreds of tons of hay.

South of the hay barn ten acres have been blocked off, which is for the Provincial Government for public abattoirs, etc., and which still leaves great blocks of land to be used as required, for leasing to private abattoir companies, etc.

J. W. Buckpitt, who was connected with the New York Central Stock Yards at Buffalo, was appointed Superintendent recently, as previously announced in these columns.

Aid to Injured, Instruction Car.—The C.P.R. has fitted up a special car for giving instruction in first aid to the injured work, to employes on its lines. The car, with an instructor has been started out on a complete tour of the system, from New Brunswick to the West and will remain at the grand divisional points for about three weeks, and at the smaller ones, for about ten days.

Poles Purchased in Canada in 1912.

The statistics in this bulletin are based on reports received from 207 telephone companies, 131 electric light and power concerns, 29 electric railways, 18 steam railways (operating telegraph and telephone lines), and 4 telegraph companies. These 389 companies reporting purchases in 1912 represent at least 95% of the wooden pole users in Canada, and the figures in this bulletin include at least 95% of the poles purchased in 1912. Pole users are divided into two groups, with steam railways, telephone and telegraph companies forming one group, and electric railway, power and light companies the other.

Table 1 shows the number, total value, average value and per cent. distribution of poles purchased in Canada in 1911 and 1912.

There were 608,556 wooden poles reported as having been purchased in 1912, an increase of 22,853 poles, or 3.9%, over 1911. While this increase is slight, it follows a decided decrease from 1910 to 1911. The average pole has a life of at least ten years, and the demand for poles is therefore more or less intermittent, depending on the building of new pole lines.

Altogether nine kinds of wood were reported for poles in 1912, with eastern cedar heading the list, as in past years. Cedar has been, and probably will be for some time, the most popular wood for telegraph, telephone and other pole lines. Although the purchases in 1912 show a decrease, wood for this purpose need not be specially strong or hard, as there is little or no mechanical strain to be endured. Durability in contact with the soil, lightness, and a slender tapering form are most essential, and cedar seems to fit those requirements better than any other native wood used in an untreated state. The use of the British Columbia species of cedar (*Thuja plicata*) has increased in the last few years, with the decrease in the supply of poles of the eastern species in the greater length classes. While these poles are not so strong nor so durable as those of eastern cedar, they can be obtained in greater lengths, and the source of supply is more easily accessible. The two species of cedar together formed over 85% of the total. Balsam fir was reported for the first time in 1912. It is being used more and more each year for all purposes, especially in the Maritime Provinces, where the supply of pine is beginning to fall below the demand. As far as form and lightness are concerned, this should make excellent pole material, if its lack of durability were made up for by some preservative treatment. Increases are to be noted in the use of western cedar, tamarack, spruce and chestnut, with balsam fir added to the list, and decreases in the use of eastern cedar, jack pine, Douglas fir and hemlock. No poles were reported in 1912 of red, white or yellow pine.

The average prices given in tables are based on the cost at point of purchase, and may or may not include transportation charges. Only in the case of those woods which are used in large quantities can the values given be taken to represent the relative value of the wood. The average value of poles in 1912 was \$1.83, an increase of only 3 cents over 1911. A slight increase was recorded in the case of eastern cedar, and other increases to be noted are in the value of spruce and jack pine poles. All other kinds of wood

decreased in value, and the balsam fir reported in 1912 was valued at an average below the general average for 1911.

Steam railways, telephone and telegraph companies reported the purchase

average value of \$1.51 per pole is an increase from 1911. The average values of poles purchased by this class of pole line companies is always less than with the electric railway, power and light concerns, as the steam railway and telephone companies are usually closer to the source of supply and purchase their

TABLE 1

KIND OF WOOD	1911				1912			
	Number	Value	Average Value	Per Cent.	Number	Value	Average Value	Per Cent.
TOTAL OF ALL USES								
Total.....	585,703	\$1,056,277	\$1.80	100.0	608,556	\$1,113,524	\$1.83	100.0
Cedar.....	463,234	746,854	1.61	79.1	378,369	613,580	1.62	62.2
Western Cedar.....	72,354	216,444	2.99	12.4	144,222	408,472	2.83	23.7
Balsam Fir.....					38,000	30,400	0.80	6.2
Tamarack.....	28,226	40,410	1.43	4.8	36,158	46,822	1.29	5.9
Spruce.....	8,764	8,983	1.02	1.5	9,127	10,334	1.13	1.5
Jack Pine.....	3,318	2,986	.90	0.6	1,790	2,710	1.51	0.3
Douglas Fir.....	7,906	29,994	3.79	1.3	612	994	1.62	0.1
Chestnut.....	150	788	5.25	*	228	147	0.64	*
Hemlock.....	555	936	1.69	0.1	50	65	1.30	*
Red Pine.....	156	2,054	13.17	*				
White Pine.....	68	728	10.71	*				
Yellow Pine.....	30	280	9.33	*				
Unspecified.....	942	5,820	6.18	0.2				

STEAM RAILWAYS, TELEPHONES AND TELEGRAPHS

Total.....	521,572	\$ 764,398	\$1.47	89.1	549,560	\$ 830,793	\$1.51	90.3
Cedar.....	422,588	595,880	1.41	81.0	341,240	462,964	1.36	62.1
Western Cedar.....	57,597	112,234	1.95	11.0	122,925	278,846	2.27	22.4
Balsam Fir.....					38,000	30,400	0.80	6.9
Tamarack.....	28,213	40,394	1.43	5.4	36,158	46,822	1.29	6.6
Spruce.....	8,577	8,730	1.02	1.6	8,567	7,869	0.92	1.6
Jack Pine.....	3,318	2,986	.90	0.6	1,790	2,710	1.51	0.3
Douglas Fir.....					612	995	1.63	0.1
Chestnut.....					228	147	0.64	*
Hemlock.....	555	936	1.69	0.1	40	40	1.00	*
Red Pine.....	156	2,054	13.17	*				
White Pine.....	68	728	10.71	*				
Unspecified.....	500	456	.91	0.1				

ELECTRIC RAILWAYS, POWER AND LIGHT

Total.....	64,131	\$ 291,879	\$4.55	10.9	58,996	\$ 282,731	\$4.79	9.7
Cedar.....	40,646	150,974	3.71	63.4	37,129	150,615	4.06	62.9
Western Cedar.....	14,757	104,210	7.06	23.0	21,297	129,626	6.09	36.1
Spruce.....	187	253	1.35	0.3	560	2,465	4.40	0.9
Hemlock.....					10	25	2.50	0.0
Douglas Fir.....	7,906	29,994	3.79	12.3				
Chestnut.....	150	788	5.25	0.2				
Yellow Pine.....	30	280	9.33	*				
Tamarack.....	13	16	1.23	*				
Unspecified.....	442	5,364	12.14	0.7				

* Less than one tenth of one per cent.

TABLE 2

KIND OF WOOD	1911				1912			
	Number	Value	Average Value	Per Cent.	Number	Value	Average Value	Per Cent.
TOTAL OF ALL USES								
Total.....	608,556	\$1,113,524	\$1.83	100.0	402,407	\$ 436,583	\$1.08	100.0
Cedar.....	378,369	613,580	1.62	62.2	263,440	255,508	0.97	65.5
Western Cedar.....	144,222	408,472	2.83	23.7	60,785	102,638	1.69	15.1
Balsam Fir.....	38,000	30,400	0.80	6.2	38,000	30,400	0.80	9.4
Tamarack.....	36,158	46,822	1.29	5.9	32,160	41,267	1.28	8.0
Spruce.....	9,127	10,334	1.13	1.5	7,148	5,607	0.78	1.8
Jack Pine.....	1,790	2,710	1.51	0.3				
Douglas Fir.....	612	994	1.62	0.1	612	994	1.62	0.2
Chestnut.....	228	147	0.64	*	222	129	0.58	*
Hemlock.....	50	65	1.30	*	40	40	1.00	*
26-30 Feet (21.1 Per Cent.) 31-35 Feet (7-8 Per Cent.)								
Total.....	128,228	310,663	2.42	100.0	47,559	190,634	4.01	100.0
Cedar.....	70,087	165,892	2.37	54.7	27,893	100,143	3.59	58.6
Western Cedar.....	50,594	132,168	2.61	39.5	19,439	90,082	4.63	40.9
Balsam Fir.....								
Tamarack.....	3,771	5,147	1.36	2.9	227	409	1.80	0.5
Spruce.....	1,976	4,721	2.39	1.5				
Jack Pine.....	1,790	2,710	1.51	1.4				
Douglas Fir.....								
Chestnut.....								
Hemlock.....	10	25	2.50	*				
36-40 Feet (3-4 Per Cent.) 40 Feet and Over (1.5 Per Cent.)								
Total.....	20,937	112,648	5.38	100.0	9,425	62,996	6.68	100.0
Cedar.....	12,325	58,089	4.71	58.9	4,624	33,947	7.34	49.1
Western Cedar.....	8,612	54,559	6.34	41.1	4,792	29,025	6.06	50.8
Balsam Fir.....								
Tamarack.....								
Spruce.....					3	6	2.00	*
Jack Pine.....								
Douglas Fir.....								
Chestnut.....								
Hemlock.....					6	18	3.00	*

* Less than one-tenth of one per cent.

of 549,560 poles in 1912, an increase of 5.4% over the total for 1911, and is evident in the cases of western cedar, tamarack and the newly added material, balsam fir. All other woods show a decrease in number, although Douglas fir and chestnut were added to the list of woods purchased by steam railways. The

poles in greater quantities. They also use more poles of the shorter length classes. These companies used all the poles purchased of balsam fir, tamarack, jack pine, Douglas fir and chestnut. They purchased 90.3% of all the poles used.

The electric railway, power and light companies purchased a total of 58,996

poles, 9.7% of all the poles purchased in 1912. This number is a decrease of 5,135, or of over 8% from the total in 1911. These companies used only four kinds of wood—cedar (eastern and western), spruce and hemlock. Hemlock was not reported in 1911 by these companies, and poles of Douglas fir, chestnut, yellow pine and tamarack reported in that year were dropped from the list in 1912. The electric companies as a rule purchase the best class of poles, of the greatest length, and seldom obtain their supply locally. These facts are probably responsible for the high values in the table. The average value per pole of \$4.79 is an increase of 24 cents over 1911.

Table 2 gives the details of the poles purchased by all classes of pole line companies, separated according to length classes.

Of the total 608,556 poles, 66.1% were from 20 to 25 ft. long, and were valued at \$1.15. Over 20% were in the 26 to 30 ft. class, and were valued at an average of \$2.42. In the 31 to 35 ft. class, 7.8% of the poles were placed, and these were valued at \$4.01. The 36 to 40 ft. poles formed 3.4% of the total at \$5.38, and the poles of 40 ft. and over, at a value of \$6.68, made up the remaining 1.5%.

Cedar poles formed the bulk of each length class and made up practically all the poles in the greater length classes (36 ft. and over). Tamarack and spruce poles were also used in the greater

length classes and formed a large per cent. of the poles between 26 and 35 ft. The jack pine poles were all in the 26 to 30 ft. class, and practically all the poles of Douglas fir, chestnut and hemlock were less than 25 ft. long. The spruce and chestnut poles in the greatest length class (40 ft. and over) were purchased for special purposes and their low prices do not indicate their relative value.

Many of the pole line companies use preservative treatments of different kinds to prevent decay and insect injury. These include impregnation of the butts of the poles with creosote, zinc chloride and other chemicals. In some cases the bark is left on the part of the pole which comes into contact with the soil, and this tends to increase the life with some kinds of wood. Painting the butts of the poles with hot tar or creosote will increase their life by several years. Many companies have found that the increased life which is accomplished by preservative treatment brings about a considerable saving in the annual cost of the upkeep of a pole line. By thorough treatment with preservatives many non-durable woods, such as balsam fir, are being used satisfactorily where their use in an untreated state would not have been possible.

The foregoing bulletin was prepared by the Interior Department's Forestry Branch, R. H. Campbell, Director of Forestry.

Orders by Board of Railway Commissioners.

Beginning with June, 1904, Canadian Railway and Marine World has 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 hearings took place, and not those on which the orders were issued. In many cases orders are not issued for a considerable time after the dates assigned to them.

19831. July 14.—Amending order 19239, May 9, re protection of G.T.R. crossing at King St., Cobourg, Ont.

19832. July 18.—Authorizing Alberta Department of Public Works to build highway crossings over G.T.P.R. Calgary Branch, at Duhamel.

19833. July 14.—Authorizing City of Saskatoon, Sask., to build highway across Canadian Northern Ry. at Hilliard St.

19834. July 11.—Substituting C. N. Ontario Ry. plan A, of June 20, showing proposed crossing over Conklin River, for plan approved under order 18598.

19835. July 17.—Authorizing Canadian Northern Ry. to build a Y through s.e. ¼ Sec. 28-55-25, w. 4 m., Alta., to be completed within three months.

19836. July 18.—Ordering C.P.R. to install improved type of automatic electric bell at Miller crossing, near Kingsbury, Que., 20 per cent. of cost to be paid out of the railway grade crossing fund.

19837. July 18.—Ordering C.P.R. to cut down 4 or 5 ft. of earth on west side of crossing of river road about 3 miles east of Kingsbury, Que., between Melbourne and Windsor Mills, and raise west approach, so that approaching trains may be seen 900 ft. away at a distance of 100 ft. from crossing, and within 60 days to install improved type of automatic electric bell, 20 per cent. of cost of installing bell to be paid out of the railway grade crossing fund.

19838. July 10.—Ordering C.P.R. to repair retaining wall, raise it at least one foot, build standard railing along same; widen road on south shore of St. Francois River, running parallel to its Orford Subdivision at mileage 55, to at least 18 ft. wide throughout, to be completed by Nov. 1.

19839. July 14.—Authorizing Ontario Public Works Department to build highway at grade across C.P.R. Sault Ste. Marie Branch, on Lot 7, Con. 1, Drury Tp.

19840. July 12.—Authorizing C.P.R. to build bridge 2.02 over Toronto Suburban Ry., near Meadowdale, Ont.

19841. July 11.—Authorizing C.P.R. to build spurs for Laurentide Brick & Sand Co., at mileage 12.25 from St. Martin Jct., Que.

19842. July 18.—Authorizing Campbellford, Lake Ontario and Western Ry. (C.P.R.) to build

spur across C. N. Ontario Ry., at mileage 122.02 from Glen Tay, Ont.

19843. July 12.—Authorizing G. T. Pacific Branch Lines Co. to build its Toftfield-Calgary Branch across highway at mileage 43.9, North Alberta District.

19844. July 21.—Approving location of G.T.R. station and freight shed to be built at New Lowell, Ont., also proposed rearrangement of track and detail plans of station and freight shed.

19845. July 14.—Approving location of G. T. Pacific Branch Lines Co.'s station at Dacer, Sask.

19846. 19847. July 14.—Authorizing City of St. Thomas, Ont., to lay 12 in. water main under Pere Marquette Rd. on Wilson Ave., between Ada and Elm Sts., and 18 in. water main under G.T.R. on Hughes St.

19848. July 14.—Authorizing Canadian Copper Co., Copper Cliff, Ont., to build crossing, with gates, over Algoma Eastern Ry., in Lot 11, Con. 4, McKim Tp.

19849. May 30.—Establishing express collection and delivery limits in St. Boniface, Man., and rescinding order 15024, Sept. 15, 1911, in same connection.

19850. July 18.—Ordering Canadian Northern Ry., within 60 days, to install improved type of illuminated electric bell at crossing of Fort William Road, between Fort William and Port Arthur, Ont., 20 per cent. of cost to be paid out of the railway grade crossing fund; speed of trains limited to 6 miles an hour over crossing; and a sign post to be erected at least 250 ft. from crossing, indicating that cars must be kept inside that point, on spur track.

19851. July 22.—Postponing effective date of modification of Rule 7 of G.T.R. Special Freight Tariff, C.R.C. E.2374, I.C.C. 1660, in Supplements 5 and 3, respectively, and of Rule 33 of C.P.R. Local Freight Tariff, C.R.C. E.2141, I.C.C. E.1288, in Supplements 9 and 6, respectively, until otherwise ordered.

19852. July 21.—Authorizing C.P.R. to build road diversion in Sec. 13-13-15, w. 4 m., and build its Suffield-Blackie Branch, at grade across highway between Secs. 12 and 13-15, w. 4 m., mileage 41.0 from Suffield.

19853. July 19.—Authorizing C.P.R. to build its double track across G.T.R. at mileage 32.56 from Toronto.

19854. July 17.—Authorizing C.P.R. to move farm crossing from its present position, at or near mileage 50, north of McAdam Jct., N.B., to 190 ft. south, on lands of G. Sterling and J. A. Peabody.

19855. July 21.—Approving clearance as shown on plan, from G.T.R. side track to one of Pratt & Letchworth Co.'s buildings, Brantford, Ont.; provided G.T.R. keeps its men off sides of cars while operating on side track.

19856. July 12.—Ordering Brockville, Westport and North Western Ry. to build cattle pass 8 ft. wide and as high as ground will permit, through embankment near to leading from barn of

D. H. and C. S. Grey, Elizabethtown Tp., Ont.

19857. July 21.—Establishing express collection and delivery limits in Grand Forks, B.C.

19858. July 22.—Disallowing cancellation of stop over arrangement at Outremont, Que., in connection with shipments of grain and grain products from Western Canada, as contained in Supplement 9 to C.P.R. all rail and lake and rail Special Tariff, C.R.C. E.2480, said supplement having been made effective June 19, and suspending, until otherwise ordered, cancellations of stop over arrangements at Toronto, West Toronto, Montreal and Outremont, in connection with shipments of grain, grain products, hay and potatoes, items 22 and 23, of C.P.R. Special Freight Tariff, C.R.C. E.2141, as contained in Supplement 16, effective July 23.

19859. July 21.—Authorizing Moose Jaw Electric Ry. to build single track on High St. West, across C.P.R. Outlook Branch.

19860. July 21.—Authorizing Toronto, Hamilton and Buffalo Ry. to cross, at grade, highway between Lots 26 and 27, Con. 3, Saltfleet Tp., with a passing siding.

19861. July 22.—Authorizing C.P.R. to build spur, for Vermont Marble Co., in Peterboro, Ont.

19862. July 23.—Amending order 19676, June 25, re switching lead at C.P.R. yards, Smiths Falls, Ont.

19863. July 21.—Authorizing Michigan Central Rd. to build weighing scales on side track leading to Canadian Shredded Wheat Co., on Lewis Ave., Niagara Falls, Ont., and approving clearances of bridge over same.

19864. July 21.—Authorizing City of St. Thomas, Ont., to lay 18 in. water main under M.C.R. on Moore St., between Talbot and Centre Sts., and Moore and Mill Sts., and on Mill St. between Centre and Amelia Sts.

19865. July 22.—Approving Great Northern Ry. Standard Passenger Tariff C.R.C. 825, applying a maximum rate of 3c. a mile between stations on its lines as follows:—Brandon, Saskatchewan and Hudson's Bay Ry.; Manitoba Great Northern Ry.; Midland Ry. of Manitoba; Victoria and Sidney Ry., and Victoria Terminal Ry. and Ferry Co.; and temporarily approving, pending judgment in inquiry into rates generally in B.C., tariff applying a maximum rate of 4c. a mile between stations on its lines as follows:—Bedlington and Nelson Ry.; Crows Nest Southern Ry.; Nelson and Fort Sheppard Ry.; New Westminster Southern Ry.; Red Mountain Ry.; and Vancouver, Victoria and Eastern Ry. and Navigation Co.

19866. July 21.—Approving, temporarily, pending judgment in inquiry into rates charged generally in B.C., the G.T. Pacific Ry. Standard Freight Mileage Tariff C.R.C. 17, including and cancelling C.R.C. 15, to apply between stations in B.C., Prince Rupert to Morricetown, inclusive.

19867. July 22.—Approving location of G. T. Pacific Ry. station at Cooking Lake, Alta., mileage 766.1 west of Winnipeg.

19868. July 23.—Extending to Sept. 15, time within which interlocking plant be installed at crossing of Canadian Northern Ry. by G. T. Pacific Ry. at Empire Ave., Fort William, Ont., as required by order 19352, May 22.

19869. July 22.—Approving location of C.P.R. station at Trossachs, Sask.

19870. July 22.—Authorizing Campbellford Lake Ontario and Western Ry. (C.P.R.) to build at grade across Ontario St., Cobourg, Ont., mileage 120.20 from Glen Tay.

19871. July 22.—Authorizing C. N. Ontario Ry. to build across and divert public road under Mississippi River bridge, in Lot 22, Fitzroy Tp.

19872. July 23.—Authorizing C.N. Ontario Ry. to build bridge across Petawawa River (west crossing), Deacon Tp., mileage 159.3 west of Ottawa.

19873. July 23.—Authorizing G. T. Pacific Branch Lines Co. to build highway across its Toftfield-Calgary Branch, at mileage 104.5 in North Alberta District.

19874. July 22.—Authorizing G.T.R. to build siding for Farquharson-Gifford Co., Stratford, Ont.

19875. July 22.—Authorizing C.P.R. to build spur for Medina Shale Brick Co. and Streetsville Brick Co., Streetsville, Ont.

19876. July 23.—Authorizing C.P.R. to build spur for Abernethy and Lougheed, in Lot 398, Sec. 12, Tp. 12, Haney, N.W.D., British Columbia.

19877. July 23.—Authorizing C. N. Ontario Ry. to build across public road between Saltfleet and Grimsby Tps., Ont.

19878. July 24.—Amending order 19593, June 16, re C.P.R. bridge 103.7, near Foster station, Que.

19879. July 23.—Authorizing C.P.R. to build spur for its Irrigation Department at Brooks, Alta., to be completed within three months.

19880. July 23.—Approving G. T. Pacific Ry. revised location and location of its station grounds, in Sec. 17-43-2, w. 4 m., Alta.

19881. July 22.—Authorizing C. N. Ontario Ry. to build across 14 highways in Saltfleet Tp.

19882. July 23.—Approving plans of C.P.R. overhead highway bridge, at Asylum Side Road, London, Ont.

19883. 19884. July 23.—Authorizing C.P.R. to build bridges, 33.5, near Cavan Station, and 5.75, near Norwood Station, Ont.; 5.8, near Station Rooth, N.B.; 7.1, near Norwood Station, 33.6, near Dunsford, and 16.9, near Ops, Ont.

19885. July 24.—Recommending to Governor in Council for sanction, indenture of lease, June 2, between Kettle Valley Ry. and C.P.R.

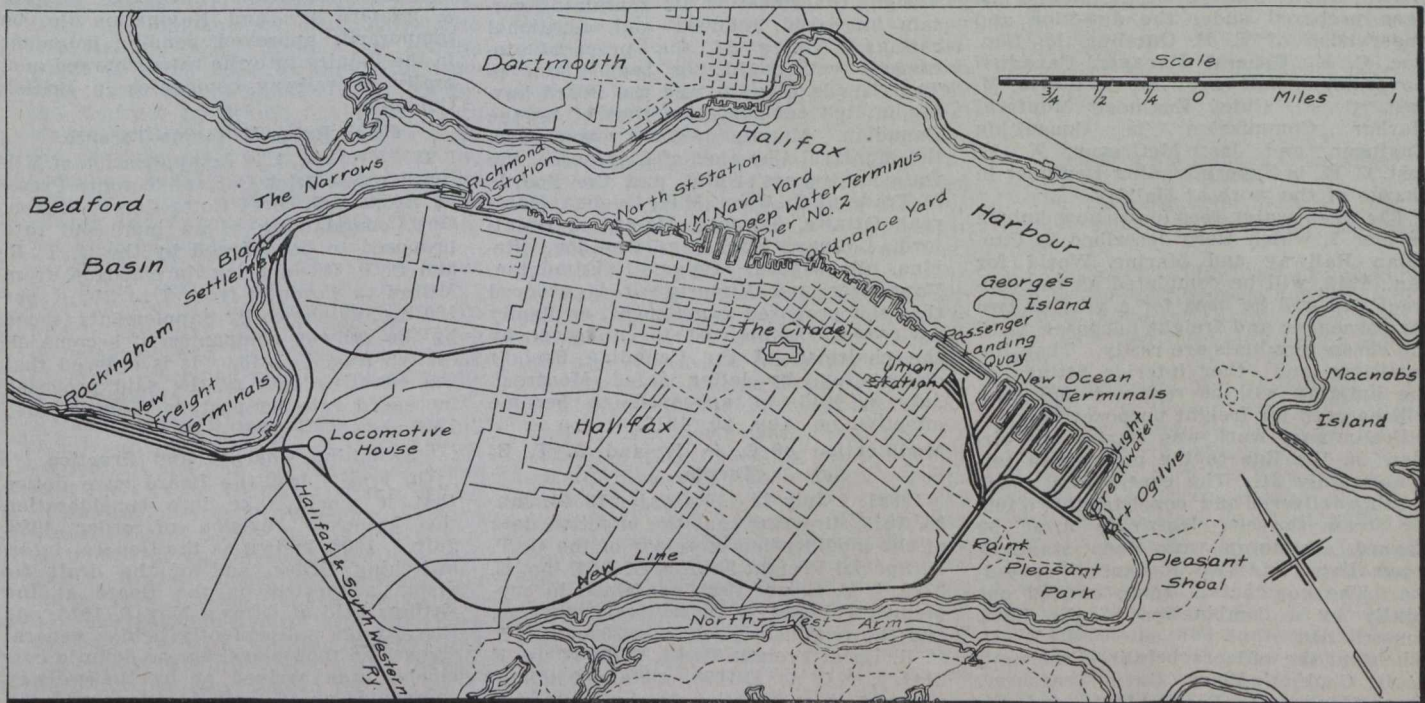
Halifax Ocean Terminals, Intercolonial Railway.

Canadian Railway and Marine World for Jan., 1912, contained an illustrated description of the deep water terminals being built at Halifax, N.S., for the Intercolonial Ry., work on which is still in progress. It, however, became apparent some months ago that these terminals would be altogether inadequate for the port's rapidly growing trade, and the Minister of Railways instructed F. P. Gutelius, M. Can. Soc. C. E., who has since been appointed General Manager, Canadian Government Railways, and F. W. Cowie, M. Can. Soc. C. E., Chief Engineer, Montreal Harbor Commission, to prepare a scheme for more comprehensive terminals, which was adopted. At present Halifax has the Richmond terminals and the "deep water" terminals, the former at Richmond, in the northern extremity of the city, the latter located quite centrally in the city, off Water St. It has been decided to place

storage and shunting of cars; the construction of an elevator which will permit of grain being loaded into ships at each of the 32 berths; a locomotive house for the cars of passenger locomotives and switch engines, and a breakwater from Point Pleasant Park to the Reid rock buoy.

The first unit will consist of a bulkhead pier, the freight and immigration sheds, passenger station, one ship and one freight pier equipped with sheds and tracks together with the necessary accessories, which will provide accommodation for eight of the largest ocean steamships. As soon as business warrants it, two more piers will be constructed, giving an additional capacity for eight such steamships; and in five or six years, or sooner if necessary, upon the opening of the Quebec bridge, provision will be made for a further accommodation of eight such steamships. As

will be no grade crossings, the railway being carried under the Halifax and South Western Ry., and in all cases either under or over all streets and routes by means of bridges, the designs for which will be made to harmonize with their surroundings. The railway has been designed for high speed passenger and heavy freight trains. The maximum curvature will be 4° , and all curves will be laid out with suitable easement curves. The maximum gradient will be 0.6%, compensated 0.04% per degree of curvature. To preserve the appearance of the residential sections of Halifax along the Northwest Arm and in the vicinity of Point Pleasant Park, the railway will be constructed from Quinpool Road to Young Ave. in a cutting of sufficient depth to give clearance for the railway under the overhead bridges, which will carry the streets and roads over the railway. The railway will be double tracked throughout, with additional lead tracks at the yards and terminals. The bridges, culverts and



Site of Halifax Ocean Terminals and Union Passenger Station, with Double Track Railway to be Built from Main Line at Rockingham.

the new ocean terminals considerably farther out in the harbor at Georges Island Bay near the ocean end of peninsula on which the city is situated.

The terminals, which are intended to be the best equipped on the Atlantic coast, will consist of a passenger landing stage or bulkhead wharf 2,000 ft. long with 45 ft. depth of water at low water of spring tides at which three of the largest ocean vessels can dock in safety without tug assistance; a wharf building the whole length of the bulkhead pier; the first floor of which will be for freight and the second floor for passengers, customs and immigration quarters. Passenger and freight tracks will run alongside the ships. The whole will be laid out so as to give the most expeditious, convenient and economical arrangements for the transfer of passengers, baggage, mails and freight from ship to rail and vice versa. This scheme of development provides for the construction of six freight piers 1,250 ft. long and from 320 to 360 ft. wide, which will be equipped with wharf freight sheds and railway tracks; yards for the

business develops and the demands of trade necessitate, the two southerly piers will be constructed, thus completing the scheme. Tenders for the landing quay and the first pier are to be called for at an early date.

The union passenger station, which will be built near the corner of Pleasant and South Sts., will be a handsome and substantial structure, and will be provided with all modern conveniences and facilities for passengers and the handling of baggage, mails, express, etc. The passenger car yard will be situated immediately southwest of and adjoining the union station, and will be of ample capacity and equipped with all necessary supply buildings and up to date facilities.

The ocean terminals will be reached by a branch railway to be built from Rockingham, on the I.R.C., four miles from the North St. station, Halifax, about five miles from the present deep water terminals, and about six miles from the new terminals, which will be situated nearer the entrance to the harbor than any existing wharf. There

structures will be of permanent construction throughout. The excavations for the railway, which will greatly exceed the embankments, will consist mostly of rock, but there will be no wasting of material. The surplus excavations from the northern end of the railway will fill in and reclaim from Bedford Basin a large and comparatively shallow arm, which will be used for the new freight terminal yard. A suitable site for this yard would otherwise be very difficult to provide, on account of the very hilly nature of the peninsula and surrounding country. This new terminal yard will be open ended and will have standing room for 1,000 cars on body tracks 4,000 ft. long, and it can be readily extended. It will take care of all freight to and from both the old and new terminals, transfer or switching engines only being used between the new yard and the city and harbor terminals. The excess materials from the railway cuttings at the southern end will be used for filling behind the quays and piers which are to be built in the harbor. Selected rock will also be obtained from

the cuttings for the construction of the rubble mound breakwater, which will extend eastward into the harbor for about 1,500 ft.

The grading of the approach railway and the construction of the terminal yard at Bedford Basin and the breakwater at the harbor, the contracts for which have been let to the Cook Construction Co., of Sudbury, Ont., and Andrew Wheaton, of Amherst, N.S., are to be completed by July 1, 1915.

The expenditure is estimated as follows:—For the first unit, including the five miles of double track railway, between \$5,000,000 and \$6,000,000; for the completed scheme about \$12,000,000.

It is proposed to at once proceed with the construction of the quay walls and of the railway, and with the dock and yard filling, the construction of the necessary overhead bridges and such other works as may be found economically convenient in connection therewith, for all of which it is estimated \$2,500,000 will be required during the current fiscal year.

The whole scheme of terminals has been prepared under the direction and supervision of F. P. Gutelius, M. Can. Soc. C. E., General Manager, Canadian Government Railways. F. W. Cowie, M. Inst. C. E., Chief Engineer, Montreal Harbor Commission, is Consulting Engineer, and Jas. McGregor, A. M. Inst. C. E., is Superintending Engineer in charge of the work at Halifax.

The deep water terminals, now known as pier 2, which were described in Canadian Railway and Marine World for Jan., 1912, will be completed as per contract and will be used for a year or two for passenger and freight purposes, until the ocean terminals are ready. Then the partitions and other interior fittings of the building will be removed and they will be used for freight purposes only.

Preliminary work was started at Fairview on the line to the new ocean terminals, July 31. The contractors' plant is being delivered and consists of two 100-ton steam shovels, electrically fitted, 50 12-yard air dump cars, four standard locomotives, and two Jordan air spreaders. The contract is being carried out jointly by a combination of the Cook Construction Co. and A. and W. D. Wheaton, the officers being:—President, A. B. Cook, Sudbury, Ont.; Treasurer, Alex. Mackenzie, Barrie, Ont., and St. Paul, Minn.; Secretary and General Manager, H. F. McLean, Toronto; other directors:—A. and W. D. Wheaton, Amherst, N. S. The company's offices are at Halifax, N. S.

Dominion Government Railway to Hudson Bay.

We are officially advised that about 2,000 men are grading, tracklaying, ballasting, etc. Sixty miles of track had been laid to July 29, and it is expected to increase this to about 150 miles this year.

Reports received at Ottawa, Aug. 7, state that from the progress made with construction there is little doubt that the line will be finished within contract time, viz., Dec., 1914. A Winnipeg press dispatch, Aug. 9, states that over 100 miles will be ready for operation next winter. Seventy miles of grading has been fully completed, and so much work has been done beyond that point that it is expected to connect up the grading done at different points to mileage 150 this year. Track laying was started May 9, and after putting in the yard

tracks and sidings, the gang started out on the main line. The ballasting gang is working close behind the tracklayers.

Work is being pushed ahead on the construction of the terminals at Nelson, on Hudson Bay. Supplies of all kinds, together with dredges and other construction plant have been sent up to the Bay for the work on progress there. (Aug., pg. 378.)

Traffic Orders by the Board of Railway Commissioners.

The dates given for orders are those on which the hearings took place, and not those on which the orders were issued:—

Changes in Freight Classification 16.

19786. July 10. The application of Canadian Freight Association, on behalf of railway companies subject to the Board's jurisdiction, under sect. 321 of the Railway Act, for an order approving of proposed Supplement 1 to Canadian Freight Classification 16, containing certain increased, reduced and additional ratings. Notice of the proposed increased ratings having been given in The Canada Gazette, and the Board having invited consideration thereof by the Canadian Manufacturers' Association, the Montreal Chamber of Commerce, the Ontario Grocers' Guild, and the Boards of Trade of St. John, N.B., Quebec, Montreal, Ottawa, Toronto, Hamilton, Brantford, London, Winnipeg, Brandon, Regina, Saskatoon, Calgary, Edmonton, Vancouver and Victoria; it is ordered that the proposed supplement, as finally revised and submitted for approval by the chairman of the Canadian Freight Association, by letter dated Montreal, July 8, 1913, be approved, to become effective on Aug. 20, 1913.

Modification of C. P. R. and G. T. R. Tariffs.

19851. July 22. Re order 18564, Jan. 25, 1913, directing that the effective date of the modification of rule 7 of the G. T. R. Special Freight Traffic, G. R. C. no. E. 2374, I. C. C. no. 1660, contained in supplements 5 and 3, respectively, thereto, and the modification of rule 33 of the C. P. R. Local Freight Tariff, C. R. C. no. E 2141, I. C. C. no. E 1288, contained in supplements 9 and 6, thereto, be postponed pending a hearing of the matter at the sittings to be held in Toronto on Feb. 7, 1913; and order 19710, June 27, 1913, postponing the effective date of said modification of rules until August 1, 1913. It is ordered that the effective date of the modification of the said rules be further postponed until otherwise ordered by the Board.

Stop Over Arrangements on C. P. R.

19858. July 22. Re applications of the Boards of Trade of Montreal and Toronto, for the disallowance of the cancellations by the C. P. R. of certain stop over arrangements at Toronto, West Toronto, Montreal, and Outremont. It is ordered that the cancellation of the stop over arrangement at Outremont, Que., in connection with shipments of grain and grain products from Western Canada, as contained in Supplement 9 to the C. P. R. "all-rail" and "lake-and-rail" Special Tariff, C. R. C. No. E. 2480, the said supplement having been made effective June 19, 1913, be disallowed. That the cancellations of the stop over arrangements at Toronto, West Toronto, Montreal, and Outremont, in connection with shipments of grain, grain products, hay, and po-

tatoes, items 22 and 23, of C. P. R. Special Freight Tariff, C. R. C. no. E. 2141, as contained in Supplement 16, made effective July 23, 1913, to the said tariff, be suspended until otherwise ordered by the Board.

Great Northern Ry. Passenger Tariffs.

19865. July 22. Re application of Great Northern Ry. under sec. 331 of the Railway Act, for the approval of its standard Passenger Tariff C. R. C. 825. It is ordered that the said tariff, applying a maximum rate of 3 cents a mile between stations on its lines of railway as follows, namely: Brandon, Saskatchewan & Hudson's Bay Ry.; Manitoba Great Northern Ry.; Midland Ry. of Manitoba, Victoria and Sidney Ry., and the line of the Victoria Terminal Ry. and Ferry Co., be approved. That the said tariff applying a maximum rate of 4 cents a mile to be charged between stations on its lines of railway as follows, namely: Bedlington & Nelson Ry., Crows Nest Southern Ry., Nelson & Fort Sheppard Ry., New Westminster Southern Ry., Red Mountain Ry., and the line of the Vancouver, Victoria & Eastern Ry. and Navigation Co. be temporarily approved, pending judgment in the inquiry into the rates charged generally by railway companies in British Columbia.

Brick Rates Milton to Toronto.

19973. Aug. 1. Re application of Milton Pressed Brick Co., and Toronto Pressed Brick and Terra Cotta Co., of Milton, Ont., complaining of an increased rate proposed to be charged by the G. T. R. and C. P. R. on brick, in carloads, from Milton to Toronto, from 3 to 3½ c. per 100 lbs., as shown by Supplements issued by the railway companies to become effective Aug. 1, 1913. It is ordered that the effective date of the said proposed increased rate be postponed until Nov., 1913.

Switching Charges and Practice.

On Feb. 4 last the Board gave notice that it would take into consideration the proposed revision of order 4988, July 8, 1908, known as the General Inter-switching Order, and of the draft revision suggested by the Board at the sittings held at Ottawa Nov. 5, 1912. At the sittings subsequently held a general discussion took place, but no definite conclusion was arrived at by the railway companies as to their position; and the Board has now asked them to make their written submission on the whole question both as to practices and rates. In addition to the question of inter-switching, many complaints have been received by the Board as to the local switching practices and charges. The Board also requires the submissions of the companies as to what rules and practices should be followed and charges made for services of this character at all points of sufficient magnitude on the lines of the respective companies to necessitate a local switching movement. As some of the objections raised by the companies as to switching movements of both kinds are based on insufficiency of the toll, the Board desires the submissions of the companies to indicate the principle that, in the opinion of the companies, should be observed in arriving at a rate basis, supported by particulars of cost the companies are put to in illustrative movements.

The Board of Railway Commissioners will on Sept. 16, take into consideration the matter of requiring railway companies to equip locomotives with air hose on the front end.

Great Northern Railway Lines in Canada.

The Midland Ry. of Manitoba made application recently to the Winnipeg City Council for permission to lay tracks on a lane between Spruce and Clifton streets, which was granted on condition that another avenue be provided for the traffic. The question of building a spur line adjacent to Sherbrooke St., between Ross and Elgin Avenues, is before the Public Utilities Commissioner.

Projected Lines in Alberta.—A press report from Calgary, Alta., credits a construction superintendent of the Great Northern Ry., with stating Aug. 7, that the G.N. Ry. interests had a route surveyed for a line from Nelson, B.C., to Lethbridge, Alta., and that construction would be gone on with during 1914.

Vancouver, Victoria and Eastern Ry. and Navigation Co.—Construction is being gone on with on the uncompleted portion of the line westerly to the summit of the Hope Mountains, and it is expected to have the line finished to that point during 1914. From this point to Hope the company will use jointly with the Kettle Valley Lines, the section which is being built by the latter company down the Coquihalla River Valley the contract for which has been let to McArthur Bros., New York. From Hope the company runs over a portion of the Canadian Northern Pacific Ry., and its own lines into New Westminster, Vancouver and a connection with the G.N. Ry. lines in the U. S.

The details of the False Creek plans are being worked out by the engineers of the G. N. R., the Canadian Northern Pacific Ry. and the British Columbia Government, and the various portions of the work are being put in hand as rapidly as possible.

Victoria and Sidney Ry.—We are officially advised that the G.N.R., having settled all matters previously at issue with the city of Victoria and the British Columbia Government regarding the bond issue of the V. and S. Ry., is now engaged improving its physical condition, putting in a great many new ties, and tie plates, and a large quantity of ballast. A steel gasoline-electric car has been purchased, and is working three round trips daily between Victoria and Sidney. An order has been placed for the building of a new barge with a capacity of nine cars, to supplement the 6-car barge now in service between the railway and Port Guichon, on the Vancouver, Victoria and Eastern Ry. (Aug., pg. 379.)

Railway Rolling Stock Notes.

The Victoria and Sidney Ry., a subsidiary of the Great Northern Ry., recently purchased a steel gasoline electric car from the General Electric Co., which it is now running three trips a day between Victoria and Sidney, B.C.

The G. T. Pacific Ry. has received one mail and express car, no. 116; 6 baggage cars, nos. 426 to 429, 431 and 432; and 10 sleeping cars, named Cork, Carlisle, Cevlon, Cumberland, Cardigan, Capetown, Clyde, Cyprus, Cornwall and Connaught.

The proceeds of a recent issue of £1,500,000 notes by the G.T.R. will be applied in part to the payment of additional rolling stock, viz:—75 locomotives and 8,000 freight cars, the contract price for which exceeds £2,000,000. This additional equipment has become necessary owing to the approaching completion of the G.T.P.R., and the gen-

eral increase of traffic throughout the system.

The C.P.R., between June 12 and July 30, placed orders for additional rolling stock at its Angus Shops, as follows:—1 second class car, 1 mail and express car, 1 pile driver, 1 box baggage car, 1 freight refrigerator car, 7 stock cars, 7 vans, 2 horse cars 72 ft. long, and 8 horse cars 60 ft. long.

The Canadian Northern Ry., between July 16 and Aug. 15, received the following additions to rolling stock:—200 box cars from the Canadian Car and Foundry Co.; 4 second class cars and 80 flat cars, from the Crossen Car Co.; 5 consolidation and 5 switching locomotives, from the Canadian Locomotive Co.; 2 consolidation locomotives, from Canadian Allis-Chalmers Co., and 20 cabooses from the Mount Vernon Car Co.

The Esquimalt and Nanaimo Ry., which has been operating oil burning locomotives over its lines for some months, has found a considerable saving in operating, but the full benefit has not been felt yet owing to the heavy expense of installing the tanks and adapting the locomotives for oil fuel. It is stated that forest fires have been avoided this year and considerable economy achieved owing to the elimination of forest patrols.

The Canadian Car and Foundry Co., between July 14 and Aug. 15, received orders for the following rolling stock:—from the Hart-Otis Car Co., 1 Rodger double plough, and 19 fifty ton all steel special Otis type general service cars, the latter being for the Algoma Steel Corporation, details of which were given in our last issue; from Cape Breton Coal, Iron and Ry. Co., 30 thirty ton twin hopper cars; from Algoma Steel Corporation, 19 fifty ton steel underframe flat cars.

All C.P.R. locomotives, with the exception of two, operating on the Mountain and Shuswap Subdivisions, between Field and Kamloops, B.C., are now using oil as fuel, instead of coal. The remaining two will shortly be converted to oil burners. The first oil burning locomotive has been placed in operation on the Cascade Subdivision, between North Bend and Vancouver, and the other locomotives operating over that subdivision will be converted as soon as possible.

The Canadian Car and Foundry Co., between June 15 and Aug. 15, delivered the following rolling stock:—to Canadian Northern Ry., 13 forty ton wood ballast cars, 332 thirty ton wood box cars; to Canadian Pacific Ry., 1,509 forty ton box cars, 301 forty ton steel underframe flat cars, 300 fifty ton ballast cars, 5 wood tourist cars, 122 forty ton steel underframe stone cars, 15 wood baggage and express cars, 6 plough cars, 14 steel underframes for Lidgerwood unloaders; to the Dominion Bridge Co., 1 pair of seventy-five ton trucks; Hart-Otis Car Co., 1 plough car; to F. H. Hopkins and Co., 1 all wood Lidgerwood flat car; to St. Lawrence Bridge Co., 4 pairs of fifty ton trucks.

The C.P.R., between June 12 and July 30, received the following additions to rolling stock:—113 freight refrigerator sleeping cars, 2 baggage and express cars sleeping cars, 2 baggage and express cars and 16 class U3 locomotives, from its Angus Shops; 1,139 steel frame box cars, 234 steel frame flat cars, 323 ballast cars, 141 stone cars, and 8 tourist cars, from the Canadian Car and Foundry Co.; 500 steel frame box cars, from the National Steel Car Co.; 232 steel frame box cars,

from the Nova Scotia Car Works; 4 ballast spreaders, 2 wrecking cranes and 9 Rodger ploughs, from F. H. Hopkins and Co.; 1 Bucyrus plough from Mussels Ltd.; 4 class G2 locomotives, from the Montreal Locomotive Works; 10 sleeping cars, from the Pullman Co.; 714 box cars, from Barney and Smith Car Co.

The Canadian Northern Ry. has received 10 six wheel switching locomotives, one of which is equipped with power reverse gear, from the Canadian Locomotive Co. Following are the chief details:—

Weight in working order	124,000 lbs.
Wheel base, engine	11 ft.
Wheel base, engine and tender	39 ft. 4½ ins.
Heating surface, firebox	131 sq. ft.
Heating surface, tubes	1,006 sq. ft.
Heating surface, total	1,137 sq. ft.
Driving wheels, diar.	50 ins.
Driving wheel centres	Cast iron.
Driving journals	8½ by 10 ins.
Cylinders, diar. and stroke	19 by 26 ins.
Boiler, type	Radial stayed.
Boiler, pressure	180 lbs.
Tubes, no. and diar.	186—2 ins.
Tubes, length	10 ft. 5 ins.
Brakes	Westinghouse American
Weight of tender, loaded	86,000 lbs.
Capacity, water	3,500 galls.
Capacity, coal	5 tons.
Tank, type	Sloping back.
Truck, type	Arch bar with steel bolsters.
Wheels, diar.	33 ins.
Wheels, type	Solid rolled steel.
Journals	4½ by 8 ins.
Brake beam	Steel trussed.

Among the Express Companies.

The Canadian Northern Ex. Co. has opened offices at Polwarth and Beadle, Sask.

The Board of Railway Commissioners has established express delivery and collection limits for Grand Forks, B.C., and has re-defined the limits for St. Boniface, Man.

The American Ex. Co. has made a distribution of Wells Fargo & Co. shares, 45,000 of which it has held for some years, among its shareholders at the rate of one share of Wells Fargo to each four shares of A. E. Co. stock. The market value of the stock is about \$5,000,000.

The Interstate Commerce Commission has ordered considerable reductions in express rates in the U.S., to become effective on or before Oct. 15. It is stated the reductions will aggregate about 16% of the companies' gross earnings. The order is to be in force for two years, to give opportunity for test of the rates under varying conditions. It is stated that the companies have suffered the loss of considerable traffic of smaller parcels through the introduction of the parcel post system, and that such a sweeping reduction of rates will be intolerable.

Railway Lands Patented.—Letters patent were issued during June, covering railway lands in Manitoba, Saskatchewan, Alberta and British Columbia, as follows:

	Acres.
Alberta Central Ry.	36.61
Calgary and Edmonton Ry.	1,266.00
Canadian Northern Ry.	141.00
Canadian Pacific Ry.	509.31
Grand Trunk Pacific Branch Lines Co.	32.78
Manitoba and North Western Ry. ...	1,124.52
Qu'Appelle, Long Lake and Saskatchewan Rd. and Steamboat Co.	4,642.40
Total	7,743.62

A consolidation of the Railway Act will be one of the matters to occupy the attention of the Dominion Parliament next session. The measure has been in preparation during the past year by S. Price, K. C., St. Thomas, Ont. A draft of the proposed measure is reported to have been completed and to be under consideration.

Canadian Pacific Railway Company's Annual Report.

Following is the 32nd annual report over the signature of the President, Sir Thos. G. Shaughnessy:—

The accounts for the year ended June 30, show the following results:

Gross earnings.....	\$139,395,699.98
Working expenses.....	93,149,825.83
Net earnings.....	\$ 46,245,874.15
Net earnings of steamships in excess of amount included in monthly reports.....	1,245,563.03
Deduct fixed charges.....	\$ 37,491,437.18
Surplus.....	10,876,352.15
Deduct amount transferred to steamship replacement account.....	\$ 36,615,085.03
Contribution to pension fund.....	\$1,000,000.00
	125,000.00
	1,125,000.00
	\$ 35,490,085.03
From this there has been charged a half yearly dividend on preference stock of 2% paid April 1.....	\$1,473,386.53
And three quarterly dividends on ordinary stock of 1 3/4 % each, paid Jan. 2, April 1, and June 30.....	10,150,000.00
And interest on instalments on New stock subscriptions, paid Oct. 15.....	569,813.87
	\$ 12,193,200.40
	\$ 23,296,884.63
From this there has been declared a second half yearly dividend on preference stock, payable Oct. 1.....	\$1,486,626.79
And a fourth quarterly dividend on ordinary stock of 1 3/4 %, payable Oct. 1.....	3,500,000.00
	\$ 4,986,626.79
Leaving net surplus for the year....	\$ 18,310,257.84
In addition to the above dividends on ordinary stock, 3% was paid from special income.	

DETAILS OF SPECIAL INCOME FOR YEAR

Balance at June 30, 1912.....	\$2,460,790.60
Interest on cash proceeds and on deferred payments for land sold.....	2,031,785.05
Interest on deposits and loans.....	1,201,906.69
Interest on C.P.R. 1st mortgage bonds acquired.....	63,461.33
Interest from Minneapolis, St. Paul & Sault Ste. Marie Ry. bonds.....	159,720.00
Interest from Mineral Range Ry. bonds.....	50,160.00
Interest from Toronto, Hamilton & Buffalo Ry. bonds.....	10,840.00
Interest from Kingston & Pembroke Ry. bonds.....	8,565.00
Interest from Dominion Government bonds.....	182,500.00
Interest from Ontario Government bonds.....	48,000.00
Interest from British Consols.....	114,569.44
Interest from Montreal & Atlantic Ry. bonds, and on other securities.....	552,298.89
Interest from Berlin, Waterloo, Wellesley & Lake Huron Ry. bonds.....	17,040.00
Dividend on St. John Bridge & Ry. Extension Co. stock.....	75,000.00
Dividends on Dominion Express Co. stock.....	240,000.00
Dividends on Minneapolis, St. Paul & S.S.M. Ry. common stock.....	890,645.00
Dividends on Minneapolis, St. Paul & S.S.M. Ry. preferred stock.....	445,326.00
Dividends on West Kootenay Power & Light Co. common stock.....	33,000.00
Dividends on West Kootenay Power & Light Co. preferred stock.....	3,850.00
Dividends on Toronto, Hamilton & Buffalo Ry. stock.....	164,246.00
Net Revenue from company's coal mines.....	305,237.93
	\$9,058,941.93
Less—Payments to shareholders in dividends:	
Oct. 1, 1912, Jan. 2, April 1 and June 30, 1913.....	5,700,000.00
	\$3,358,941.93
From this a dividend has been declared, payable Oct. 1.....	1,500,000.00

The working expenses were 66.82% of the gross earnings, and the net earnings 33.18% as compared with 64.89 and 35.11%, respectively, in 1912.

Four per cent. consolidated debenture stock for £1,938,394 was created and sold, and of the proceeds £1,051,619 was ap-

plied to the construction of authorized branch lines, and £886,775 to the acquisition of bonds of other railway companies whose lines constitute a portion of your system, the interest on which had, with your sanction, been guaranteed by your company. Four per cent. preference stock for £1,569,091 was created and sold, the proceeds being used to meet capital expenditures that had your previous sanction.

Your guarantee of interest was endorsed on 4% consolidated bonds of the M., St. P. and S. S. M. Ry. Co. for \$2,623,000, issued and sold to cover the cost of 131.15 miles of railway added to that company's system.

During the year 474,798 acres of agricultural land were sold for \$7,487,268. an average of \$15.77 an acre. Included in this area there were 7,944 acres of irrigated land which brought \$48.88 an acre, so that the average price of the balance was \$15.20 an acre.

Shares of ordinary capital stock for \$2,000,000, the difference between the capital stock outstanding and the amount authorized by the shareholders Oct. 7, 1908, were sold in the market early in the year and realized a premium of \$2,860,821.80, which will be used for additions and improvements to your property.

In pursuance of your policy of building and extending branch lines in Western Canada to provide present and incoming settlers with transportation facilities, a line is projected from near Swift Current, on your main line in Saskatchewan, in a northwesterly direction to cross your Lacombe branch at or about Coronation, and eventually to reach Sedgewick, a station on your line between Saskatoon and Edmonton, 290 miles. The first 115 miles of this line should be constructed without delay, and the balance in stretches as circumstances may seem to warrant; two other lines, one of which will run northwesterly from Bassano, on your main line in Alberta, to a connection with the Swift Current line, 118 miles, and the other from Gleichen to Shepard, 40 miles, should be built within the next year. These lines will serve important agricultural districts north and south of your main line and will answer all the purposes of a second track between the points mentioned for some years to come. The Weyburn branch, running south of, and parallel to, your main line in Saskatchewan and Alberta, to a connection with your Alberta railway south of Lethbridge, 436 miles, of which 196 miles have been constructed, or are in process of construction, under your authority, should be further extended year by year until completed. Branch lines from Gimli, Man., in a northerly direction for 26 miles, and from Snowflake, Man., in a westerly direction, 9 miles, and an extension of the Suedfeld branch in Saskatchewan, 27 miles, will be of substantial service to settlers in these respective districts. Your directors will ask you to sanction the construction of such part of this mileage as you have not already authorized, and the issue, from time to time, of the requisite 4% consolidated debenture stock to meet the expenditure.

Among the important additions and improvements now in process of execution are, 29 miles of second track between Islington and Guelph Jct., on the Ontario Division, to cost \$750,000; 133 miles of additional second track between Sudbury and Port Arthur, on the Lake Superior

Division, to cost \$5,300,000; 178 miles of additional second track between Brandon and Calgary, to cost approximately \$5,000,000; 18 miles of second track and grade improvements, including a double track tunnel, five miles long, between Six Mile Creek and the Loop, near the summit of the Selkirk Mountains, at a cost, without electrification, of about \$8,000,000; 139 miles of second track between Revelstoke and Vancouver, in stretches where it will give the most immediate relief, to cost \$6,350,000. When this work is finished and the new lines between Regina and Shepard, to which reference has already been made, are constructed, there will be 200 miles of double track between Sudbury and Port Arthur, leaving 352 miles to be provided in the future; between Port Arthur and Calgary there will be 1095 miles of double track, leaving gaps aggregating only 165 miles, and between Calgary and Vancouver 158 miles of double track, leaving 488 miles to be built hereafter. A second track on such a large portion of your main line between Sudbury and the Pacific Coast will relieve the congestion that has prevailed from time to time and will enable you to handle your traffic more expeditiously and economically, and the construction of the long tunnel, between Six Mile Creek and the Loop, will eliminate 4 1/2 miles of snowsheds that it would be necessary to reconstruct at very great expense if the present location of the railway through that section were adhered to. It is not the intention of your directors to proceed with the second track in the more difficult sections along the Thompson and Fraser Rivers until your Kettle Valley Line is ready for traffic between Midway and Hope, in 1915, so that you may have an alternative route available between Medicine Hat and Vancouver via the Crowsnest Pass if anything unforeseen should occur during the prosecution of the double track work to obstruct traffic on the main line.

You will be asked to approve the purchase of two intermediate steamships for the Atlantic trade, 500 ft. long, 64 ft. beam, 11,600 gross tonnage, 15 knots speed, to cost approximately £300,000 each, and two steamships for the Pacific Coast service, 395 ft. long, 54 ft. beam, capable of making 22 1/2 knots an hour at sea, and to cost approximately £200,000 each. The two Atlantic steamships are urgently required for your second and third class passengers and freight traffic between European ports and Canada, and the two fast passenger steamers for the Pacific Coast will further improve the excellent service that you are now providing for the large and growing passenger business between Vancouver, Victoria and other ports on the Pacific Coast.

When the last issue and sale of ordinary capital stock was authorized by you, a portion of the proceeds of the sale was directed to be applied to the retirement of the outstanding 5% first mortgage bonds of the company that mature in 1915, and, therefore, your directors deemed it desirable to give notice to the holders in May last that the company would receive and pay for any of the bonds that might be surrendered before the end of the fiscal year. Pursuant to this notice bonds to the amount of £4,234,700, or \$20,608,873.33, were delivered and paid for. These, with the bonds that the company had previously acquired, make a total of £4,487,900, or \$21,841,113.33, that have been retired and cancelled, leaving outstanding bonds to the amount of £2,703,600, or \$13,157,520, to be re-

deemed and cancelled as opportunity of-
fers

For the convenience of those desiring to make transfers in Montreal of shares of your ordinary capital stock, the Bank of Montreal has been appointed Registrar and the Royal Trust Company has been appointed Transfer Agent for the Montreal Registrar, and a bylaw giving effect to the appointments will be submitted for your consideration and approval.

It will be observed that the mileage covered by the statement of gross earnings and working expenses has increased from 10,983 in 1912 to 11,602 in this fiscal year. The business of a number of these new lines will naturally add but little to your gross income for a time while traffic is being developed, but meantime their maintenance and operation have a marked effect on the working expenses. This coupled with more liberal expenditure for maintenance of way and of equipment and advances in the wage scale in some branches of the service, will account, in a large measure, for the abnormal increase in your working expenses over the previous year.

The item Railway and Equipment in the balance sheet is \$69,491,729.27 more than it was in 1912, after applying upwards of \$10,000,000 from surplus account. Of this amount \$30,137,885.86 represents the cost of additional rolling stock, \$9,113,950.21 the expenditure for the construction of branch lines, \$36,809,675.82 for additions and improvements to your property, and \$3,126,347.32 for additional shops and machinery over the whole system.

CONDENSED BALANCE SHEET

ASSETS	
Railway and equipment	\$452,320,780.60
Ocean, lake and river steamships	23,049,283.21
Acquired Securities (cost)	100,207,933.88
Properties held in trust for the company	4,386,260.00
Deferred payments on land and town site sales	44,499,115.78
Advances to lines under construction	13,750,205.47
Advances and investments	12,072,811.65
Material and supplies on hand	18,628,206.99
Current assets:	
Agents and conductors balances	\$4,118,739.47
Net traffic balances	120,713.25
Miscellaneous accounts receivable	7,013,831.74
Temporarily invested in Government securities	10,088,734.86
Cash in hand	30,274,848.30
	\$720,531,465.20

NOTE.—In addition to above assets, the company owns 6,287,250 acres of land in Manitoba, Saskatchewan and Alberta (average sales past year \$15.77 an acre), and 1,697,994 acres in British Columbia.

LIABILITIES	
Capital stock	\$200,000,000.00
Payments on subscription to new issue capital stock (60,000,000.00 at 175)	63,451,667.50
4% preference stock	74,331,339.79
4% consolidated debenture stock	163,257,224.32
Mortgage bonds:	
First Mortgage, 5%... 34,998,633.33	
Less amount redeemed and cancelled	21,841,113.33
Algoma Branch, 1st mortgage	3,650,000.00
Current liabilities:	
Audited vouchers	14,785,322.70
Pay rolls	6,549,901.24
Miscellaneous accounts payable	9,176,078.79
Algoma Branch, 1st mortgage	30,511,302.73
Current liabilities:	
Audited vouchers	14,785,322.70
Pay rolls	6,549,901.24
Mis. accounts payable	9,176,078.99
	30,511,302.73

Interest on funded debt and rental of leased lines:	
Coupons due July 1, 1913, and including coupons overdue not presented	1,208,016.17
Accrued fixed charges	183,785.05
Equipment obligations	1,391,801.22
Equipment replacement fund	880,000.00
Steamship replacement fund	2,425,426.02
Appropriation for additions and improvements	5,061,338.29
Reserve fund for contingencies	17,912,996.41
Lands and town sites Sales	3,569,463.37
Surplus	63,334,285.19
	77,597,100.36
	\$ 720,531,465.20

FIXED CHARGES FOR YEAR

1st mortgage bonds 5% due July 1, 1915	\$ 1,749,931.66
St. Lawrence & Ottawa Ry. 4% 1st mortgage bonds	38,933.34
Man. S. West. Colzn. Ry. 1st mortgage 5% bonds due June 1, 1934	127,200.00
Toronto, Grey & Bruce Ry. rental	140,000.00
Ontario & Quebec Ry. debenture stock 5%	975,129.56
Ontario & Quebec Ry. ordinary stock 6%	120,000.00
Atlantic & North West Ry. 1st mortgage bonds due Jan. 1, 1937	323,633.34
Algoma Branch 5% 1st mortgage bonds, due July 1, 1937	182,500.00
New Brunswick Southern R., 1st Mortgage bonds, 3%	15,000.00
Lindsay, Bobcaygeon & Pontypool Ry. 1st mortgage bonds, 4%	20,000.00
Shuswap & Okanagan Ry. 1st mortgage bonds, 4%	49,990.40
Rental, Calgary & Edmonton Ry.	218,357.60
Rental, Farnham to Brigham Jct.	1,400.00
Rental, Mattawankeag to Vanceboro	23,800.00
Rental, New Brunswick Ry. system	372,829.74
Rental, Terminals at Toronto	24,459.56
Rentals, Terminals at Hamilton	36,817.60
Rental, Hamilton Jct. to Toronto	42,191.12
Rental, St. Stephen & Milltown Ry.	2,050.00
Rental, Joliette & Brandon Ry.	5,000.00
Rental, Lachine Canal Branch	939.96
Interest on Montreal & Western Ry.	14,733.42
Interest on equipment obligations	54,266.66

4% CONSOLIDATED DEBENTURE STOCK	
Interest from July 1, 1912	\$6,273,216.64
Interest from Jan. 1, 1913	71,971.55
	6,345,188.19
Less received from subsidiary, Northern Colonization R.	8,000.00
	6,337,188.19
	\$10,876,352.15

EXPENDITURES ON CONSTRUCTION—ACQUIRED AND BRANCH LINES

Moosejaw N.W. Branch	\$ 613,147.07
Craven-Bulyea Branch	6,037.40
Virden-McAuley Branch	103,274.05
Stonewall Branch Extension	94.40
Lauder Branch	196,467.44
Weyburn-Lethbridge Branch	2,293,337.5
Langdon Branch	477.78
Kipp-Aldersyde Branch	61,554.62
Bassano-Irricana Branch	180,911.75
Regina-Colonsay Branch	180,528.82
Estevan-Forward Branch	483,201.34
Waldo-Galloway Branch	25,352.72
Moosejaw S. W. Branch	103,005.72
Wilkie N. W. Branch	74,667.92
Kerobert N. E. Branch	404,564.95
Wilkie-Anglia Branch	97,092.79
Swift Current S. E. Branch	138,044.03
Swift Current M. W. Branch	1,412,370.58
Boissevain-Lauder Branch	106,134.34
Suffield S. W. Branch	824,817.64
Three Forks-Bear Lake Branch	85,464.23
Gimli-Riverton Branch	28,557.66
Bassano E. Branch	235,884.44
Snowflake W. Branch	8,549.36
Longue Pointe Extension, Montreal	1,115,533.45
Surveys of projected lines	334,933.75
	\$9,113,050.21

EXPENDITURE ON ADDITIONS AND IMPROVEMENTS

Quebec to Bonfield:	
Additional sidings, buildings, stations and yards	\$ 157,064.63
Permanent bridges and improvements of line	239,535.34
Right of way	550.00
	\$ 397,149.97
Montreal Terminals	1,970,536.98
Windsor St. Station extension	827,405.66
Double track bridge over St. Lawrence River	306,396.01
Bonfield to Port Arthur:	
Additional sidings, buildings, stations and yards	625,022.79
Permanent bridges and improvements of line	365,554.08

Double tracking	2,018,997.64
Right of way	6,051.04
	3,015,625.55
Port Arthur to Field:	
Additional sidings, buildings, stations and yards	1,161,046.76
Permanent bridges and improvements of line	797,487.76
Winnipeg station and hotel	67,776.36
Winnipeg terminals	259,835.02
Winnipeg new elevator	347,252.23
East Winnipeg yard	2,075,355.21
Fort William terminals, including coaling plant	3,551,126.15
Double tracking	2,301,743.64
Right of way	Cr. 7,490.08
Calgary hotel	1,085,113.11
	11,639,246.16

Field to Vancouver:	
Additional sidings, buildings, stations and yards	327,116.37
Permanent bridges and improvements of line	584,592.52
Vancouver terminals	1,302,394.59
Double tracking	2,787,230.14
Right of way	783.88
	4,002,117.50
Banff Springs Hotel Addition	1,206,875.92
Chateau Lake Louise	940,318.85
Empress Hotel, Victoria	599,225.75
Hotel Vancouver	660,584.34
	\$25,565,482.69

Branch Lines:	
South Western Branch	\$ 5,537.49
Stonewall Branch	3,470.57
Selkirk Branch	6,816.88
Emerson Branch	8,870.42
Nakusp and Slocan Branch	416.13
Revelstoke and Arrow Lake Branch	4,558.66
Snowflake Branch	Cr. 7.55
Waskada Branch	1.75
St. Lin. Branch	231.16
Lake Timiskaming Branch	26,282.49
MacGregor Branch	765.72
Mission Branch	16,796.02
Arcole-Regina Branch	84,674.64
North Star Branch	Cr. 155.60
Lac du Bonnet Branch	90.88
Wolseley-Reston Branch	1,119.26
Lachine Canal Branch	5,621.36
Toronto-Sudbury Line	346,758.11
Pheasant Hills Branch	225,357.47

Souris Branch:	
Additional sidings, buildings, stations and yards	192,368.81
Permanent bridges and improvements of line	202,488.48
Right of way	334.65

Algoma Branch:	
Additional sidings, buildings, stations and yards	66,257.21
Permanent bridges and improvements of line	33,671.22
Grade reduction	171,380.04
Crowsnest Pass Branch:	
Additional sidings, buildings, stations and yards	47,297.56
Permanent bridges and improvements of line	198,388.50
Right of way	558.78
Crowsnest Pass Branch: McLeod-Lethbridge deviation	403.35

British Columbia Southern Ry.:	
Additional sidings, buildings, stations and yards	21,040.68
Permanent bridges and improvements of line	26,312.84
Right of way	887.85
Balfour Extension	4,293.29
Yahk branch	773.97
	1,703,663.09

Telegraph extensions and additions	269,231.02
Office building, Toronto	429,827.73
Office building, Edmonton	229,417.35
Office building, Saskatoon	184,711.15
Office building, Hamilton	112,980.05
Rented and temporary sidings	245,673.67

Total main line and branches \$28,740,986.75

RECEIPTS

Cash in hand, June 30, 1912	\$33,628,819.03
Temporarily invested in Government securities	10,088,734.86
Surplus Revenue	\$35,490,085.03
Special Income	6,598,151.33
	42,088,276.36

Land Department:		
Lands and townsites:		
Net proceeds of sales	7,691,757.74	
E. & N. Ry. sales		
1905 to June 30		
1912.....	3,457,033.00	
	11,148,790.74	
Less cost of lands ac-		
quired with E. & N.		
Ry.....	1,330,000.00	
Irrigation expenditures	4,022,813.14	
	5,795,977.60	
Collection of deferred		
payments on pre-		
vious years' sales..	7,463,720.45	
	13,259,698.05	
Less amounts remain-		
ing in deferred pay-		
ments on year's		
sales.....	10,494,014.35	2,765,683.70
Bonuses:		
Dominion Govern-		
ment subsidy		
On Selkirk Branch—		
Gimli Extension..	4,346.43	
On Stonewall branch	81,200.00	85,546.43
Properties held in trust		
for the company.....		112,073.08
Capital stock:		
Remaining instal-		
ments on \$18,000-		
000 ordinary stock	10,083,205.01	
Sale of \$2,000,000		
ordinary stock.....	4,860,821.80	
Subscription to \$60,-		
000,000 additional		
ordinary stock at		
\$175.00		
Payments on instal-		
ments.....	63,451,667.50	78,395,694.31
4% Preference Stock:		
Amount realized from issue	£ 1,569,-	
091.....	7,291,138.50	
Consolidated debenture stock:		
Amount realized from issue	£ 1,938,-	
394.....	9,214,735.57	
Add:		183,670,661.84
Advances to lines		
under construction	13,750,205.47	
Advances and invest-		
ments.....	12,072,811.65	
Current assets.....	11,253,284.46	
	37,076,301.58	
Amount at June 30,		
1912.....	38,844,001.17	1,767,699.59
	\$185,438,361.43	
EXPENDITURES:		
Dividends on preference stock:		
2% paid Oct. 1, 1912	\$1,333,901.94	
2% paid April 1, 1913	1,473,386.53	
	\$ 2,807,288.47	
Dividends on ordinary stock:		
2½% paid Oct. 1, 1912	4,500,000.00	
2½% paid Jan. 2, 1913	4,500,000.00	
2½% paid Ap. 1, 1913	5,000,000.00	
2½% paid June 30,		
1913.....	5,000,000.00	19,000,000.00
Interest on instalments on subscrip-		
tion to new ordinary stock.....	569,813.87	
Construction of acquired and branch		
lines.....	9,113,050.21	
Additions and improvements, main		
line and branches.....	28,740,986.75	
Additions and improvements, leased		
and acquired lines.....	8,068,689.07	
Rolling stock, shops and machinery..	30,818,198.19	
Ogden shops at Calgary.....	2,446,034.99	
Ocean, lake and river steamships:		
Additional steam-		
ships and appur-		
tenances for Paci-		
fic Coast Service..	362,258.48	
Less sale of S.S. City		
of Nanaimo.....	6,000.00	
	356,258.48	
Less amount paid		
from steamship re-		
placement.....	256,222.00	
	100,036.48	
Additional river steam-		
ers and barges.....	205,980.52	
Payments on account of		
steamships Empress		
of Asia and Empress		
of Russia.....	2,808,584.17	
Less amount paid		
from steamship re-		
placement.....	1,404,292.08	
	1,404,292.09	
	1,710,309.09	
1st mortgage 5% bonds redeemed at		
\$21,841,113.33	22,256,599.32	
Less bonds previously held in ac-		
quired securities	1,232,240.00	1,234,187.92
	21,022,411.40	

Securities Acquired:		
Alberta Central Ry.		
1st mortgage bonds	2,240,000.00	
Alberta Ry. & Irriga-		
tion Co. 1st mort-		
gage bonds.....	2,396,000.00	
Esquimalt & Nanai-		
mo Ry. 1st mort-		
gage bonds.....	4,832,000.00	
Georgian Bay & Sea-		
board Ry. 1st		
mortgage bonds..	4,441,000.00	
Kingston & Pem-		
broke Ry. 1st mort-		
gage bonds.....	504,000.00	
Kootenay Central		
Ry. 1st mortgage		
bonds.....	2,970,000.00	
South Ontario Paci-		
fic Ry. 1st mort-		
gage bonds.....	495,000.00	
Shuswap & Okanagan		
Ry. 1st mortgage		
bonds.....	954.11	
St. Marys & West-		
ern Ontario Ry.		
1st mortgage bonds	356,500.00	
Alberta Ry. & Irriga-		
tion Co. stock.....	25,568.00	
Alberta stock yards		
stock.....	54,637.50	
Dominion Atlantic Ry.		
preferred stock....	321.20	
Dominion Atlantic		
Ry. 2nd debenture		
stock.....	924,666.67	
Esquimalt & Nanai-		
mo Ry. stock.....	1,083,853.94	
Manitoba & North		
Western Ry. capi-		
tal stock.....	50.00	
Public Markets Limi-		
ted, stock.....	225,000.00	
Toronto, Hamilton		
& Buffalo Ry. stock	271,500.00	
	20,821,051.42	
Payment of equipment obligations...	160,000.00	
Increase in material and supplies on		
hand.....	5,610,775.09	
	\$150,888,608.55	
Deduct:		
Current liabilities...	30,511,302.73	
Interest on funded		
debt.....	1,391,801.22	
Equipment replace-		
ment fund.....	2,425,426.02	
Steamship replace-		
ment fund.....	5,061,338.29	
Reserve fund for con-		
tingencies.....	3,569,463.37	
	42,959,331.63	
Less amount at June 30,		
1912.....	37,145,501.35	5,813,830.28
	145,074,778.27	
Temporarily invested in Government		
securities.....	10,088,734.86	
Cash on hand.....	30,274,848.30	
	\$185,438,361.43	

STATEMENT OF EQUIPMENT		
Locomotives.....	2,052	
*First and second class passenger cars, baggage		
cars and colonist sleeping cars.....	2,063	
First class sleeping, dining and cafe cars.....	436	
Parlor cars, official and paymasters' cars.....	84	
Freight and cattle cars (all kinds).....	79,085	
Conductors' vans.....	1,274	
Boarding, tool and auxiliary cars and steam		
shovels.....	5,414	
*Includes cars in Line Service as follows:		
St. John and Boston Line, 12 cars, 80.04% owned by		
other lines; Montreal and Boston Line, 14 cars,		
68.33% owned by other lines; Toronto, Hamilton		
and Buffalo Line, 14 cars, 63.96% owned by other		
lines.		
Ocean, lake and river steamships:		
Atlantic Serv. ce., 16; Pacific Service, 5; Pacific		
Coast Service, 25; Upper Lake Service, 5; British		
Columbia Lake and River Service, 22; Ferry Service,		
2.		

DESCRIPTION OF FREIGHT FORWARDED		
	1912	1913
Flour, barrels.....	8,459,850	8,093,936
Grain, bushels.....	151,731,691	171,952,738
Live stock, head.....	1,663,315	1,782,986
Lumber, feet.....	2,806,735,006	3,210,306,090
Firewood, cords.....	305,079	293,536
Manufactured articles, tons	7,196,225	9,519,346
All other articles, tons.....	9,092,821	9,625,665

FREIGHT TRAFFIC		
	1912	1913
Number of tons carried	25,940,238	29,471,814
Number of tons carried		
one mile.....	10,391,650,965	11,470,001,871
Earnings per ton per		
mile.....	0.77 cts.	0.77 cts.

PASSENGER TRAFFIC		
	1912	1913
Number of passengers car-		
ried.....	13,751,516	15,480,934
Number of passengers car-		
ried one mile.....	1,626,577,067	1,784,683,370
Earnings per passenger		
per mile.....	1.96 cts.	1.99 cts.

TRAFFIC STATISTICS		
Earnings of Lake and River Steamers not included		
TRAIN MILEAGE		
	1913.	1912
Passenger trains.....	22,333,592	19,591,027
Freight trains.....	27,611,103	25,638,692
Mixed trains.....	1,888,095	1,727,792
Total trains.....	51,832,790	46,957,511

CAR MILEAGE		
Passenger		
Coaches and P. D.		
and S. cars.....	110,347,064	100,088,130
Combination cars..	3,206,048	2,917,523
Baggage, mail and		
express cars.....	46,677,110	42,678,970
Total passenger		
cars.....	160,230,222	145,684,623
Freight.		
Loaded.....	581,397,285	556,244,798
Empty.....	165,627,992	140,210,180
Caboose.....	30,617,975	27,871,524
Total Freight cars	777,643,252	724,326,502
Passenger cars per traffic		
train mile.....	6.62	6.83
Freight cars per traffic		
train mile.....	26.36	26.47

PASSENGER TRAFFIC		
Passengers carried		
(earning revenue)..	15,298,048	13,593,569
Passengers carried		
(earning revenue)		
one mile.....	1,766,982,013	1,610,251,856
Passengers carried		
(earning revenue)		
one mile per mile of		
road.....	155,451	149,549
Average journey per		
passenger, miles....	115.51	118.46
Average amount re-		
ceived per passenger	\$2.28	\$2.30
Average amount re-		
ceived per passenger		
mile, cts.....	1.97	1.94
Average number of		
passengers per train		
mile.....	72.95	75.53
Average number of		
passengers per car		
mile.....	15.56	15.63
Revenue from passen-		
gers per passenger		
car mile, cts.....	30.72	30.31
Total passenger train		
earnings per train		
mile, \$.....	1.75	1.75
Total passenger train		
earnings per mile		
of road.....\$	3,724.92	3,471.85

FREIGHT TRAFFIC		
Tons of revenue freight		
carried one mile....	11,242,690,998	10,180,782,322
Tons of non-revenue		
freight carried one		
mile.....	1,743,928,157	1,615,529,852
Total tons (all classes)		
freight carried one		
mile.....	12,986,619,155	11,796,312,174
Tons of revenue freight		
carried one mile per		
mile of road.....	989,081	945,519
Tons of non-revenue		
freight carried one		
mile per mile of		
road.....	153,423	150,039
Total tons (all classes)		
freight carried one		
mile per mile of		
road.....	1,142,504	1,095,558
Average amount re-		
ceived per ton per		
mile of revenue		
freight, cts.....	0.784	0.772
Average No. of tons of		
revenue freight per		
train mile.....	381.12	372.02
Average No. of tons of		
non-rev. freight per		
train mile.....	59.12	59.03
Average No. of tons of		
(all classes) freight		
per train mile.....	440.24	431.05
Average No. of tons of		
revenue freight per		
loaded car mile....	19.34	18.30
Average No. of tons of		
non-rev. freight per		
loaded car mile....	3.00	2.91
Average No. of tons of		
(all classes) freight		
per loaded car mile.	22.34	21.21
Freight train earnings		
per loaded car mile c	15.15	14.13
Freight train earnings		
per train mile....\$	2.99	2.87
Freight train earnings		
per mile of road....\$	7,750.78	7,298.71

STATEMENT OF PENSION DEPARTMENT		
TO JUNE 30		
Balance at June 30, 1912.....		\$685,404.32
Amount contributed by company for year		125,000.00
Amount received as interest.....		40,521.44
		\$850,925.76

Payment of pension allowances for year..	169,329.16
Balance in cash and investments.....	\$681,596.60
Number on Pension Roll at June 30.	
Under 60 years of age.....	73
Between 60 and 70 years of age.....	294
Over 70 years of age.....	238
Total.....	605

Grand Trunk Railway Betterments, Construction, Etc.

Bonded Freight Shed in Montreal.—

The company is building a freight shed, 1,200 by 60 ft., for bonded freight at Point St. Charles, Montreal.

At one end will be the office, 60 by 60 ft., giving accommodation for the general, cartage and Customs staff, etc., on two floors, with basement below, in which will be the heating plant, storage room for records and a waiting room for shed laborers.

The building will have concrete foundation up to the floor line of shed with brick walls above, faced with red pressed brick facing. There will be a flat roof, covered with felt and gravel and supported on columns and beams. The office portion will be of fireproof construction.

The shed will have continuous doors along the track side, with glazed steel sashes above, whilst on the other side there will be doors every 15 ft.

At intervals through the building will be travelling cranes, which will be capable of handling a load of 6 tons straight from the cars to the teams on the opposite side of building. Scales for the weighing of freight will also be provided.

A driveway 30 ft. wide will be provided on Wellington St., which will be paved with scoria paving blocks, provision being made at intervals for driveways across the sidewalk.

Track Elevation in Montreal.—The order for the elevation of the G.T.R. tracks in Montreal is reported to have been prepared for issue by the Board of Railway Commissioners. The estimated cost of the work is over \$8,000,000, and it may amount to as much as \$10,000,000. The only question said to be undecided is the proportion of the cost to be paid by the city. The actual cost of the track elevation is a little over \$5,000,000, towards which the city is authorized to contribute \$2,500,000, but the company asks for an additional \$500,000. The remaining part of the estimated cost of the work is made up of the alteration of terminal facilities to suit the track elevation, and for the building of a new passenger station to replace the present Bonaventure one.

Stratford Station, Yards, Etc.—A start was made, Aug. 8, on the deflection of the Stratford-Buffalo line in connection with the rearrangement of the yards. The Goderich line will also be changed, and it is stated that there is hardly a line in the entire yard that will not be altered before the work is completed. The work on the new station building is being pushed forward, but it is feared that there will be some delay with the stone work, as the quarries at Gananoque are much behind with deliveries. The station building is estimated to cost \$60,000. (Aug., pg. 379.)

Alberta and Great Waterways Ry.—Press reports Aug. 13, state that an agreement has been reached between the Alberta Government and the promoters of the A. and G.W. Ry. by which the proceeds of the bond issue now held by the banks will be released.

Canadian Northern Railway Construction, Betterments, Etc.

The question of the Atlantic Coast terminals of the C. N. R. is being discussed in the press at considerable length. On the one hand the probability of the granting of running rights over the Intercolonial Ry. to St. John and Halifax is given credence, while on the other Boston, Mass., and Portland, Me., are advocated. Sir Donald Mann, Vice President, is reported to have stated, Aug. 12, that the company did not contemplate making Portland its Atlantic terminal. The newspaper reports made a terminal at Boston a part of the Portland terminal. The whole question is, however, being given consideration, but there is nothing definite in view at present.

Sir Donald Mann returned east, Aug. 5, from a trip of inspection over the lines under construction in Western Canada. In an interview he stated that the line from Port Arthur easterly giving connection with Montreal and Quebec, via Toronto, would be opened for traffic by December. On the Canadian Northern Pacific Ry. there were only 80 miles of grading uncompleted, and this line would be finished through from Edmonton to Vancouver by the fall of 1914. The terminals at Port Mann, Vancouver and Victoria were being rapidly pushed forward.

Montreal-Ottawa-Port Arthur Line.—

The sections of this line which are being completed for opening this year, are those between Montreal and Hawkesbury, there connecting with the line now in operation into Ottawa, and the line west of Sudbury to Port Arthur. On this latter section a train service is being operated to Ruel, and track has been laid for a considerable mileage beyond. At Obo, some track has been laid easterly, and about 25 miles westerly. About 150 miles of track have been laid easterly from Port Arthur. With the exception of the bridges across the Nepigon River and at the end of Kapuskasing Lake, all the steel bridges on the line have been completed.

The section of the line which will be brought to completion by the end of 1914, or early in 1915, extends from Ottawa to the junction with the Toronto-Sudbury line at Capreol. Construction is being proceeded with. The questions at issue between the company and the North Bay Town Council, are still unsettled, but an early arrangement is hoped for. It is stated that a possible solution for some of the points will be an agreement with the Temiskaming and Northern Ontario Ry. for the use of that railway's station and terminal facilities.

Canadian Northern Ry.—Track is reported to have been laid on what is known as the Fort Rouse cut off at Winnipeg, and it is expected to have it in operation early in September. This cutoff will enable grain trains from the West to go through to the C. N. R. yards at St. Boniface, and to the G. T. Pacific Ry. yards at Transcona, without passing through the Fort Garry terminals. This will relieve the terminals of a large amount of shunting, and consequent delay of traffic.

The Board of Railway Commissioners has authorized the opening for traffic of the diversion of the Coste Point branch from sec. 21, tp. 11, range 2, east of the first principal meridian.

The extension of the branch now terminating at Bienfait to Estevan, Sask., 9 miles, has been graded, and it is ex-

pected to have the steel laid and the ballasting done by Oct. 1. The grading was done by the Western Canada Construction Co.

A plan and book of reference, giving details of route, etc., of the C.N.R. Alaska branch, as located through tps. 25-26, ranges 20-23, west of the third meridian, Saskatchewan, has been deposited in the Land Titles office at Moose Jaw, Sask.

The company's line will enter Moose Jaw, north of the C.P.R. tracks, and will cross the Cousin's siding by an overhead trestle 35 ft. high, according to plans laid before the City Council, which have been approved.

Hugh Sutherland, Executive Agent, C.N.R., Winnipeg, recently stated that the C.N.R. and the G.T. Pacific Ry. were planning to erect union stations in every city in Western Canada where the two lines came together.

Every effort is being made to complete the line into Calgary and to have it in operation this fall. It was expected to have the line finished for opening Sept. 1, but there had been considerable delay in the delivery of the steel for the bridges, which had held up construction considerably.

A contract is reported to have been let to John McLeod and Son, Winnipeg, for the erection of a station for the C. N. Western Ry. at Edmonton, at an estimated cost of \$40,000.

Canadian Northern Pacific Ry.—Track laying is reported to be in progress westerly in the vicinity of Yellow Head Pass, and grading is in progress right up to the Albreda Summit, to which point the construction is in charge of Mackenzie-Mann and Co.'s Winnipeg staff. The construction from Port Mann to the Albreda Summit is in charge of the Vancouver office. Track has been completed to mileage 86 north of Kamloops, while considerable progress has been made with the work beyond that point.

The Lulu Island branch has been completed and was reported ready for official inspection Aug. 4.

Construction was started Aug. 11 on the first part of the terminal buildings at Port Mann. This will consist of a 15-stall locomotive house, a repair house 140 by 312 ft., and a turntable. The foundation work, which is being done by the Northern Construction Co., necessitates the driving of 2,800 piles. The buildings will be put up by the Imperial Construction Co.

Sir Donald Mann stated on the occasion of his visit to Vancouver, July 26, that a start would be made right away on the filling in and other work on the False Creek terminal site, Vancouver.

Vancouver Island Lines.—In connection with the building of the branch line along the Saanich Peninsula—which is referred to locally as the Patricia branch—notice has been given of the deposit with the Minister of Public Works at Ottawa, of the plans for the trestle bridge and embankment across the Selkirk water to carry the line from the Songhees Reserve to the Selkirk Bridge on the Gorge Road, and also the plans for the railway ferry terminal at the Patricia Bay terminal.

The plans for laying out the Songhees Reserve for terminal purposes have been prepared, and J. Montgomery, of the Imperial Construction Co., was in Victoria, Aug. 10, arranging for the starting of construction. (Aug., pg. 380.)

Mainly About Transportation People.

W. D. REID, President, Reid Newfoundland Co., visited St. John's, Nfld., during August.

D. C. CORBIN, President, Eastern British Columbia Ry., of Spokane, Wash., spent August in Yukon and Alaska.

A. R. CREELMAN, K.C., director, C.P.R., who is visiting in England, expects to return to Canada during September.

Lieut.-Col. J. W. LITTLE, who died at Springbank, London, Ont., recently, was a director of the London and Lake Erie Ry.

G. J. DESBARATS, Deputy Minister of Naval Affairs, rescued a boy who had fallen into the lake at Banff, Alta., recently.

H. P. DWIGHT, President Great Northwestern Telegraph Co., who died in Toronto some months ago, left an estate of \$97,546.

A. J. GORRIE, formerly Receiver, Quebec and Lake St. John Ry., Quebec, spent a short vacation during August, at Lake St. Joseph, Que.

GEORGE BURY, Vice President, C.P.R., was the guest of the City of Regina, Sask., recently when he gave his views on handling the grain crop.

R. L. FAIRBAIRN, General Passenger Agent, Canadian Northern Ry., Toronto, and Mrs. Fairbairn, were visitors during August, at Lake St. Joseph, Que.

Prof. D. BURNS, formerly a Fellow of the Faculty of Applied Science and Engineering of the University of Toronto, died at Pittsburgh, Pa., July 27.

C. A. HAYES, General Traffic Manager, Canadian Government Railways, was a guest of the Maritime Press Association at St. John, N.B., recently.

A. W. SMITHERS, Chairman of the Board, G.T.R., arrived in Canada towards the end of August on his annual inspection trip over the system.

J. G. ENTWISTLE, Superintendent, District 3, Western Division, Canadian Northern Ry., Edmonton, Alta., has been granted leave of absence for two months.

LORD STRATHCONA has contributed £10,000 to the fund being raised by the Lord Mayor of London, for the acquirement of the Crystal Palace for the nation.

L. H. CURRY, son of Hon. N. Curry, President Canadian Car and Foundry Co., Montreal, was married in England recently to Miss M. S. McKeen, of Halifax, N.S.

Capt. ALEX. CREIGHTON, a former Port Warden of Montreal, and who had been associated with other shipping interests in Montreal and Vancouver, died in London, Eng., Aug. 4.

F. M. SPAIDAL, General Superintendent, C. N. Quebec Ry., and Quebec and Lake St. John Ry., Montreal, with Mrs. and Miss Spaidal, spent the summer vacation at Lake St. Joseph, Que.

ALFRED PRICE, whose appointment as Assistant General Manager, Eastern Lines, C.P.R., was announced in our last issue, arrived in Montreal, Aug. 8, from Calgary, Alta., to take up his new duties.

G. E. GRAHAM, Superintendent, District 2, British Columbia Division, C.P.R., Vancouver, is announced to have resigned to become General Manager of the Coquitlam Terminal Co., Coquitlam, B.C.

J. E. DALRYMPLE, Vice President (Traffic), G.T.R., and G.T. Pacific Ry.,

has been elected a director of the Northern Navigation Co., as representing the G.T.R. interests, vice W. E. Davis, deceased.

F. H. McGUIGAN, formerly Fourth Vice President, G.T.R., has been appointed to represent that company in the arbitration under the industrial disputes investigation act, respecting wages of track men.

P. B. MOTLEY, Engineer of Bridges, Eastern Lines, C.P.R., Montreal, has been elected a member of the Canadian Society of Civil Engineers' committee to prepare a standard specification on reinforced concrete work.

W. F. TYE, ex-President, Canadian Society of Civil Engineers, who has been visiting in Europe, with his family, for some time, has returned to Canada, and has taken up his residence at the Ritz-Carlton Hotel, Montreal.

D. McNICOLL, Vice President, F. L. WANKLYN, General Executive Assistant, and J. W. LEONARD, Assistant to



A. A. Goodchild,
General Storekeeper, Eastern Lines,
Canadian Pacific Railway.

the Vice President, C.P.R., Montreal made a tour of inspection over the Dominion Atlantic Ry. at the end of July.

A. M. NANTON, director, Winnipeg Electric Ry., and associated with a number of other companies, more or less connected with transportation, has been elected a director of the Ogilvie Milling Co., in place of the late Sir Edward Clouston.

Mrs. W. H. Rosevear, wife of W. H. ROSEVEAR, ex-General Car Accountant, G.T.R., Montreal, died at Dublin, Ireland, Aug. 19, following a heart attack. Mr. and Mrs. Rosevear left Canada about two months ago for a trip to Switzerland, Great Britain and Ireland.

G. FERNLEY, formerly City Freight Agent, Canadian Government Railways, Toronto, was presented with a gold watch by a number of transportation men, Aug. 11, on his leaving to take up his new duties as Commercial Agent, same system, Montreal.

LORD STRATHCONA celebrated his 93rd birthday, Aug. 6. It is about 75 years ago since he came to Canada, sailing in a vessel which took six weeks on the trip. This was about a year before the first trans-Atlantic steamship made its voyage from England to New York.

W. R. FITZMAURICE was presented with a silver tea service by the I.R.C. staff at Amherst, N.S., Aug. 11, on his leaving there, where he was station agent, for Newcastle, N.B., where he has been appointed Assistant Superintendent, Moncton and Ste. Flavie District, I. R.C.

S. G. TIFFIN was presented with a diamond tie pin at Toronto, Aug. 11, by a number of transportation men, on his leaving there, where he had been General Agent, Canadian Government Railways, to take up his new position as District Freight Agent, Intercolonial Ry., St. John, N.B.

W. DOWNIE, General Superintendent, Atlantic Division, C.P.R., who was recently granted leave of absence for a year, and who is at present touring in Europe, will not, it is reported, resume his duties on the expiry of his leave. It is stated that he has decided to retire, and to take up residence in Vancouver.

T. G. ARMSTRONG, whose appointment as Assistant Master Car Builder, Western Lines, C.P.R., Winnipeg, was announced in our last issue, entered C.P.R. service in 1902, since when he has been, to 1906, foreman at Farnham, Que.; 1906 to Feb. 1, 1908, Car Foreman, Winnipeg; Feb. 1, 1908 to July 3, 1913, General Foreman, Winnipeg.

J. M. GIBBON, who has been appointed General Advertising Agent, C.P.R., Montreal, was born at Udewella, Ceylon, Apr. 12, 1875, and entered C.P.R. service, June 1908, as advertising agent, London, Eng., which position he held to Aug. 10, 1913. Prior to entering C.P.R. service he had engaged in journalism on some of the chief English illustrated weeklies.

H. ELLIOTT, President, Northern Pacific Ry., has been elected a director, and appointed President of the New York, New Haven and Hartford Rd., vice C. S. Mellen, resigned. Effective Sept. 1. It is also announced that he will be appointed Chairman of the Board, as soon as the necessary bylaw creating the position can be passed.

HON. JOHN SHARPLES, who died at Quebec, July 30, aged 65, was, at various times, interested in many transportation companies, having held the following positions,—member Quebec Harbor Commission, director Quebec Bridge Co., director Quebec Ry., Light and Power Co., director Quebec Steamship Co., Vice President, Great Northern Ry. of Canada.

W. P. CLOUGH, heretofore Vice President, Northern Pacific Ry., New York, is reported to have been appointed Chairman of the Board of Directors in charge of the financial administration of the company. It is stated that under this title he succeeds H. Elliott, heretofore President, who has been appointed President, New York, New Haven and Hartford Rd.

ALEXANDER GIBSON, who died at Marysville, N.B., Aug. 14, aged 93, was one of the industrial and railway pioneers of the Maritime Provinces. He built the New Brunswick Ry., now incorporated with the C.P.R., and in conjunction with the late Hon. J. B. Snowball, built the Canada Eastern Ry., between Fredericton and Loggieville, now a part of the Intercolonial Ry.

W. E. FOSTER, whose appointment as Solicitor for Ontario, G.T.R., Montreal, was announced in our last issue, was born at Belleville, Ont., June 27, 1866, and entered the Legal Department, G.T.R., Sept. 30, 1884, as a clerk and student under John Bell, Q.C., General Counsel, Belleville, Ont., later becoming his assistant, and on Mr. Bell's death in 1905, he went to Montreal in a similar capacity, remaining so until Jan. 1, 1910, since when he has been, to July 15, 1913, Assistant Solicitor for Ontario.

G. E. BUNTING, whose appointment as General Western Freight Agent, Allan Line Steamship Co., and Manager, Allan and Co., Chicago, Ill., was announced in our last issue, was born at Toronto, Feb. 8, 1873, and entered transportation service, Sept. 1, 1889, since when he has been, to May 1, 1891, clerk to Division Freight Agent, G.T.R., Toronto; May 1, 1891 to Oct. 1, 1898, clerk, General Office, Lehigh Valley Rd., Buffalo, N.Y.; Oct. 1, 1898, to May 15, 1905, chief claim clerk, Canada Atlantic Ry., Ottawa; May 15, 1905, to June 15, 1913, Travelling Agent, Allan Line, Toronto.

In an automobile accident near Detroit, Mich., on Aug. 9, L. E. Beilstein, until recently General Manager of the Toledo Railways & Light Co., and J. T. Ross, Consulting Engineer of the Northern Ohio Traction & Light Co., and the Lake Shore Electric Ry., and the chauffeur, were killed, and J. F. Collins, Vice President and General Manager of the Michigan United Traction Co., and E. F. Wickwire, Sales Manager of the Ohio Brass Company, Mansfield, Ohio, were seriously injured. Mr. Wickwire had an ankle broken and suffered from severe strain, but is reported to be recovering satisfactorily.

A. E. McMASTER, whose appointment as Commercial Agent, G. T. Pacific Ry., Regina, Sask., was announced in our last issue, was born at Perth, Ont., Oct. 22, 1885, and entered railway service in 1902, since when he has been, to May 1903, in Freight Office, C.P.R., Keewatin, Ont.; May, 1903, to Aug., 1907, various positions, including assistant agent, C.P.R., Port Arthur, Ont.; Aug., 1907, to Aug., 1908, agent and chief clerk to Superintendent, G. T. Pacific Ry., Fort William, Ont.; Aug., 1908, to July 1, 1913, agent and General Agent, G. T. R., G.T.P.R. and G.T.P. Coast Steamship Co., Prince Rupert, B.C.

F. G. ADAMS, whose appointment as Division Freight Agent, G. T. Pacific Ry., Edmonton, Alta., was announced in our last issue, was born at St. John's, Nfld., Apr. 6, 1878, and entered railway service, Sept. 4, 1893, since when he has been, to Dec. 31, 1902, clerk, G.T.R. General Office, Montreal; Jan. 1, 1903, to Mar. 31, 1907, Contracting Freight Agent and Travelling Freight Agent, G.T.R., Montreal; Apr. 1, 1907, to Aug. 31, 1908, Contracting Freight Agent, G.T.R., Winnipeg; Sept. 1, 1908, to July 31, 1911, Travelling Freight Agent, G.T.R., Winnipeg; Aug. 1, 1911, to July 14, 1913, Commercial Agent, G.T. Pacific Ry., Regina, Sask.

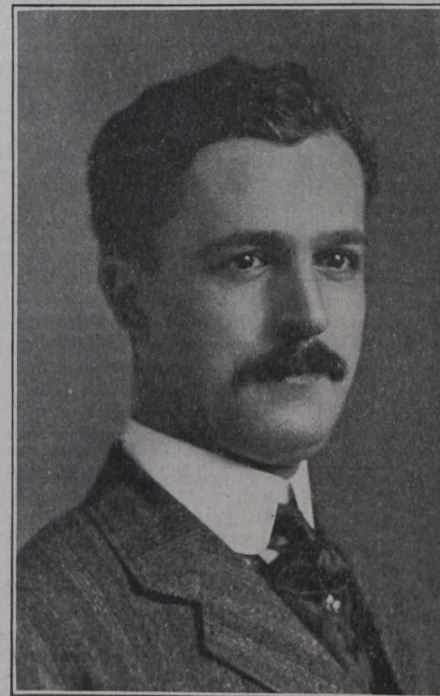
A. C. SHAW, whose appointment as General Passenger Agent, Western Lines, C.P.R., Winnipeg, was announced in our last issue, was born at Detroit, Mich., May 12, 1865, and entered railway service in 1880, since when he has been, to 1882, ticket clerk, Great Western Ry., Toronto; 1882 to Mar. 13, 1886, in private business; Mar. 13, to Dec. 1, 1886, clerk, Passenger Department, C.P.R., Toronto; Dec. 1, 1886, to Dec. 1, 1900,

clerk, Passenger Department, C.P.R., Montreal; Dec. 1, 1900 to Nov. 1, 1910, General Agent, Passenger Department, C.P.R., Chicago, Ill.; Nov. 1, 1910, to July 1, 1913, Assistant General Passenger Agent, Western Lines, C.P.R., Winnipeg.



W. E. Foster,
Assistant Solicitor, Grand Trunk Railway.

ARTHUR PIERS, who has retired from the position of Manager, C.P.R. Steamship Lines, Liverpool, Eng., on account of ill health, was born in 1851,



C. H. Bowes,
Assistant General Passenger Agent, Lines West
of Revelstoke, B.C., Canadian Pacific
Railway.

and was educated in France and England. He entered transportation service in 1870 as clerk in the office of General Manager, Great Western Ry. of Canada, since when he has been, to 1882, secretary, and assistant to General Manager,

same road; 1882 to 1889, secretary to General Manager, C.P.R.; 1889 to 1891, in shipping business in London, Eng.; 1891 to 1901, Superintendent, C.P.R. Steamship Lines; 1901 to June, 1903, General Superintendent, C.P.R. Steamships; June, 1903, to Aug. 20, 1913, Manager, C.P.R. Steamship Lines, Liverpool, Eng.

F. M. RUTTER, A. M. Can. Soc. C. E., whose appointment as Assistant Division Engineer, Maintenance of Way, Eastern Division, C.P.R., Montreal, was announced in our last issue, was born at Toronto, Dec. 26, 1880, and educated at Upper Canada College and Toronto University. He entered C.P.R. service, Apr., 1902, since when he has been, to 1904, chairman and rodman, on location surveys and construction, in Ontario and Quebec; 1904 to 1906, Resident Engineer on construction Toronto-Sudbury Line; 1906 to 1907, transitman, Maintenance of Way Department, Montreal; 1907 to 1911, Resident Engineer, Maintenance of Way, Woodstock, N.B.; 1911 to July, 1913, Resident Engineer, Maintenance of Way, Toronto.

R. N. CARD, who has been appointed City Freight Agent, G.T. Pacific Ry., Vancouver, B.C., entered G.T.R. service in Oct., 1899, since when he has been, to Nov., 1902, chief yard clerk, Hamilton, Ont.; Nov., 1902, to Feb., 1904, chief yard clerk, London, Ont.; Feb., 1904, to Aug., 1908, car distributor, Toronto; Aug., 1908, to Nov., 1912, agent, G.T. Pacific Ry., Fort William, Ont.; Nov., 1912, to July 15, 1913, chief clerk, Traffic Department, G. T. Pacific Ry., Vancouver, B.C. During the latter part of July, he suffered from a severe attack of neurasthenia, and went to Winnipeg for medical treatment, under which he improved sufficiently to be able to go to his farm at Asquith, Sask., where he expects to spend the remainder of the summer.

E. E. LLOYD, who has been appointed Auditor of Stores and Mechanical Accounts, C.P.R., Montreal, was born at Great Grimsby, Eng., Sept. 2, 1868, and came to Canada in 1876, settling in Winnipeg. He entered C.P.R. service, Dec. 27, 1887, since when he has been, to June 13, 1894, in various positions in the Stores Department, Winnipeg; June 13, 1894, to Dec. 17, 1897, in charge of pay rolls and labor statistics, same department, Winnipeg; Dec. 17, 1897, to Jan. 31, 1903, chief clerk, same department, Vancouver, B.C.; Feb. 1, 1903, to Nov. 30, 1904, chief clerk to General Storekeeper, Montreal; Dec. 1, 1904, to Jan. 14, 1910, chief clerk to Auditor of Stores and Mechanical Accounts, Montreal; Jan. 15, 1910, to July 31, 1913, Assistant Auditor of Stores and Mechanical Accounts, Montreal.

C. H. BOWES, whose appointment as Assistant General Passenger Agent, C. P. R., Vancouver, B.C., was announced in our last issue, was born at Bangor, Me., Mar. 22, 1877, and entered railway service, June, 1896, since when he has been, to 1898, stenographer and clerk to General Passenger Agent, Bangor and Aroostook Rd., Bangor, Me.; 1898 to 1900, chief clerk, same office; 1900 to 1905, chief clerk to Passenger Traffic Manager, same road; 1905 to 1906, Travelling Passenger Agent, C.P.R., St. John, N.B.; 1906, chief clerk to District Passenger Agent, C.P.R., St. John, N.B.; 1906 to 1907, chief rate clerk, Consolidated Steamship Lines, New York; 1907 to 1908, assistant rate clerk, Boston and Albany Rd., Boston, Mass.; 1908 to Aug., 1910, chief clerk, Passenger Department, C.P.R., Vancouver, B.C.; 1911, Passenger

Agent, British Columbia Coast Steamship Service, C.P.R., Vancouver, B.C.; 1911 to July 1, 1913, assistant to General Passenger Agent, C.P.R., Vancouver, B.C.

F. R. PORTER, whose appointment as Assistant General Freight Agent, G.T. Pacific Ry., Winnipeg, was announced in our last issue, was born at Stratford, Ont., June 13, 1875, and entered G.T.R. service, Apr. 23, 1892, since when he has been, to May 1, 1896, clerk and stenographer, Assistant Superintendent's, and Local Freight Agent's offices, Stratford, and London, Ont.; May 1, 1896, to Jan. 31, 1898, clerk, Division Freight Office, Stratford, Ont.; Feb. 1 to Nov. 30, 1898, stenographer to Division Freight Agent, Hamilton, Ont.; Dec. 1, 1898, to July 31, 1899, chief clerk to Division Freight Agent, Stratford, Ont.; Aug. 1, 1899, to Feb. 28, 1901, chief clerk to Division Freight Agent, Hamilton, Ont.; Mar. 1, 1901, to July 31, 1902, Soliciting Freight Agent, Hamilton, Ont.; Aug. 1 to Dec. 31, 1902, Travelling Freight Agent, Hamilton, Ont.; Jan. 1, 1903, to July 10, 1910, Assistant Foreign Freight Agent, Toronto; July 11, 1910, to July 14, 1913, Division Freight Agent, G.T. Pacific Ry., Edmonton, Alta.

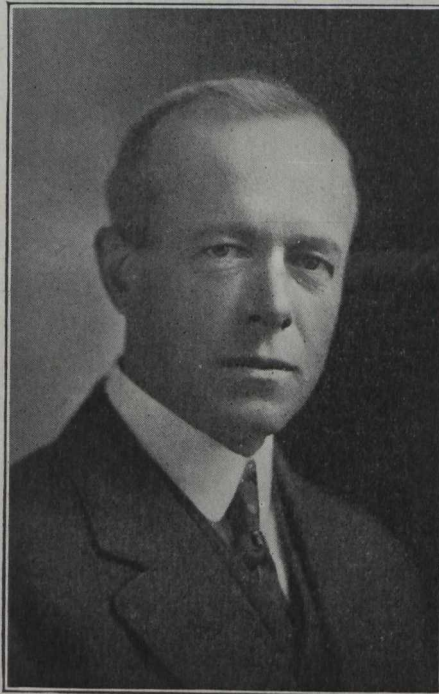
WM. ALEX. DUFF, A.M. Can. Soc. C.E., who has been appointed Engineer of Bridges, Intercolonial Ry., Moncton, N.B., was born at Hamilton, Ont., Apr. 20, 1877, and graduated from Toronto University in Applied Science in 1901. During the summer of 1900, he was engaged as Assistant to Engineer on Construction, Toronto, Hamilton and Buffalo Ry., Hamilton, Ont.; and from 1901 to 1902, field draughtsman and acting Resident Engineer, Vancouver, Victoria and Eastern Ry. and Navigation Co., Grand Forks, B.C.; 1902 to 1903, Assistant to Engineer on Construction, G.T.R., Hamilton, Ont.; 1903, draughtsman, Dominion Bridge Co., Montreal; 1903 to 1905, draughtsman and checker, Kenwood Bridge Co., Chicago, Ill.; 1905 to 1907, draughtsman and checker, Canadian Bridge Co., Walkerville, Ont.; 1907 to 1908, chief draughtsman, Bridge Department, National Transcontinental Ry., Ottawa; 1908 to 1913, Assistant Bridge Engineer, National Transcontinental Ry., Ottawa.

A. DAVIDSON, whose appointment as General Agent, G.T.R. System, Prince Rupert, B.C., was announced in our last issue, was born at St. Henri, Montreal, Jan. 29, 1885, and entered railway service, Aug. 22, since when he has been, to Nov. 20, 1901, clerk, Foreign Freight Department, C.P.R., Montreal; Nov. 20, 1901, to Mar. 16, 1903, clerk, Vice President's office (Traffic), C.P.R., Montreal; Mar. 16, 1903, to Aug. 15, 1904, stenographer, General Freight Department, C.P.R., Vancouver, B.C.; Aug. 15, 1904, to Mar. 23, 1905, secretary to Assistant Freight Traffic Manager, C.P.R., Winnipeg; Mar. 23, 1905, to Apr. 1, 1909, tracing, claims, rate and steamship clerk, General Freight Office, C.P.R., Vancouver, B.C.; Apr. 1 to Oct. 1, 1909, chief clerk to Assistant General Freight Agent, C.P.R., Vancouver, B.C.; Oct. 1, 1909, to June 1, 1910, Travelling Freight Agent, Steamship Lines, C.P.R., Vancouver, B.C.; June 1, 1910, to July 15, 1913, City Freight Agent, G.T.R., G. T. Pacific Ry. and G.T. Pacific Steamship Co., Vancouver, B.C.

JOHN McMILLAN, whose appointment as General Superintendent of Telegraphs, Western Lines, C.P.R., Winnipeg, was announced in our last issue, and whose portrait appears in this issue, was

born at Liverpool, Eng., Nov. 2, 1866, and entered telegraph service, June 2, 1883, since when he has been, to Mar. 1, 1885, Construction Department from Lake Superior to Laggan, Alta., C.P.R.; Mar. 1, to Sept., 1885, Foreman, Telegraph Construction, Government Military Lines in the Northwest during the Riel Rebellion; Sept., 1885, to 1888, on telegraph maintenance, C.P.R., Winnipeg; 1888 to 1895, Maintenance Department, C.P.R.; 1895 to 1896, telegraph operator, C.P.R., Winnipeg; 1896 to 1902, circuit manager, repeater chief and telegraph agent, C.P.R.; 1902 to 1906, Telegraph Inspector, C.P.R., Winnipeg; 1906 to 1907, Assistant Superintendent of Telegraphs, C.P.R., Winnipeg; 1907 to Jan. 1, 1912, Superintendent of Telegraph, Calgary, Alta.; Jan. 1, 1912, to July 1, 1913, Superintendent of Telegraphs, Manitoba Division, C.P.R., Winnipeg.

D. CROMBIE, who has resigned as General Superintendent of Transportation, G.T.R., Montreal, was born at Hamilton, Ont., May 13, 1864, and entered



A. C. Shaw,
General Passenger Agent, Western Lines,
Canadian Pacific Railway.

ed railway service in 1882, since when he has been, to 1887, telegraph operator, G.T.R.; 1887 to 1889, ticket clerk, same road, Chatham, Ont.; 1889 to 1890, dispatcher, same road, London, Ont.; 1890 to 1892, dispatcher, Flint and Pere Marquette Rd., Saginaw, Mich.; 1892 to 1894, car distributor, same road; 1894 to Jan. 1, 1900, Car Service Agent, same road; Jan. 1 to July, 1900, Superintendent Car Service, Pere Marquette Rd., Detroit, Mich.; July, 1900, to 1903, Superintendent of Transportation, same road, Detroit, Mich.; 1903 to Feb., 1907, in commercial business; Feb. to Oct., 1907, Master of Transportation, Middle Division, G.T.R., London, Ont.; Oct., 1907, to Nov. 22, 1910, Assistant to General Transportation Manager, same road, Montreal; Nov. 22, 1910, to Jan. 14, 1913, Assistant to Vice President, Transportation, Maintenance and Construction, same road, Montreal, Jan. 14, to Aug. 1, 1913, General Superintendent of Transportation, same road, Montreal.

National Transcontinental Railway Construction.

It was reported in Ottawa, Aug. 6, that the line from Moncton, N. B., to Levis, Que. had been completed, and it was expected that the Commission would take the balance of the completed mileage over from the contractors about Sept. 30.

Work on the car ferry landing stage at Levis was started, Aug. 10, on the Quebec Warehousing Co.'s site, adjacent to the G.T.R. station. Tracks are being laid to connect with the Quebec bridge, and connection will also be given with the Intercolonial Ry. and the Quebec Central Ry. A contract for dredging at the slip has been let to La Compagnie Generale d'Enterprises Publique, Que., which also has the contract for building the slip. The approximate quantity of material to be removed is 28,000 cubic yards of rock and 2,000 cubic yards of other material.

Temporary tracks have been laid from the north approach of the Quebec Bridge to the Allan wharf, and it is expected that they will be completed to the Champlain Market site in Quebec, Sept. 1.

Tenders are being received to Sept. 2 for the erection of locomotive and car shops at St. Malo, Que.

The work of completing the line between the end of steel west of Quebec, and Cochrane, Ont., is being pushed forward, and it is expected to have the track laid during the winter, and to finish up the bridge building in the spring, so as to have the line fully completed for traffic by August, 1914. The finishing up of the line between Cochrane and Lake Superior Jct., Ont., is being proceeded with, and M. Donaldson, Vice President, G.T.P.R., recently stated that an announcement would shortly be made as to the taking over of the line from the west to this point. (Aug., pg. 387.)

Grand Trunk Pacific Railway Construction

Track is reported to have been laid to mileage 1166 west of Winnipeg, and to a point east of Smithers, B.C., on the section being built easterly from Prince Rupert. The Board of Railway Commissioners has authorized the operation of traffic between Beament, mileage 195, and Morricetown, mileage 205, on this section.

Work on completion of the Regina boundary branch is being pushed, and the grading of the yards in Weyburn, Sask., the terminus of a branch, is being proceeded with. It is proposed to lay down 7.5 miles of track and to erect station and other buildings. A large steel bridge over the Souris River is in course of erection.

Track laying is reported completed between Regina and Moose Jaw, Sask., and it is expected that steel will be laid for some miles on the grade completed beyond this point before the end of the year.

A train service is in operation to Beiseker, mileage 163 out of Tofield, Alta., to a point 38 miles from Calgary. The ballasting on this 38 miles has not been completed, but it was expected to make an announcement of the date of opening the line into Calgary by Aug. 31. A temporary station will be used pending the completion of the bridge across the Elbow River, which will give access to the site of the former barracks of the R.N.W.M.P., which is being laid out for terminal purposes. (Aug., pg. 387.)

Canadian Railway AND Marine World

ESTABLISHED 1898.

Devoted to Steam and Electric Railway,
Marine, Express, Telegraph, and Railway and
Canal Contractors' Interests.
Official Organ of the various Canadian
Transportation Associations.
Published on the first of each month.

ACTON BURROWS, LIMITED - Proprietors.
70 Bond Street, Toronto, Canada.

ACTON BURROWS, A. Can. Soc. C. E.
Managing Director and Editor-in-Chief.
AUBREY ACTON BURROWS - Secretary and
Business Manager.

Associate Editor - JOHN KEIR
Associate Editor - DONALD F. KEIR
Mechanical Editor - FREDERICK H. MOODY, B.A.Sc.

Authorized by the Postmaster General for Can-
ada, for transmission as second class matter,
July 3, 1912.

Entered as second class matter, July 25, 1913,
at the Postoffice at Buffalo, N.Y., under the Act
of Congress of March 3, 1879.

SUBSCRIPTION PRICES, INCLUDING
POSTAGE:
TORONTO AND WEST TORONTO POSTAL
DELIVERY, \$1.25 a year.

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to CANADIAN RAILWAY AND MARINE
WORLD.

NOTICE TO ADVERTISERS.
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TORONTO, CANADA, SEPTEMBER, 1913.

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Railway Finance, Meetings, Etc.

Atlantic and Lake Superior Ry.—A meeting of holders of participation in the Atlantic and Lake Superior Ry. Trust Fund was held in Montreal, Aug. 20, to agree to an increase of the issue of the prior lien bonds of the Quebec Oriental Ry. from £50,000 to £100,000.

Canadian Northern Pacific Ry.—An issue of £800,000 of 4½% terminal bonds, guaranteed by the British Columbia Government, was floated on the London, Eng., market July 30, and was reported to have been fully subscribed before the advertised time of closing at a premium of ¼.

The Canadian Northern Ry. Co. is reported to have sold \$3,500,000 one year 6% notes, guaranteed by the Dominion Government, and secured by the deposit of its debentures with the Government, to W. A. Read and Co. and the Illinois Trust and Savings Bank. The notes are redeemable six months after July 15 at 101 and interest on 30 days notice. It is stated that about half of these notes have been resold in London, Eng., the remainder being disposed of in the U.S.

The absorption of the Winnipeg and Northern Ry. and of the Canadian Northern Ry. Branch Lines Co. by the C.N.R. Co. has been completed, and the several lines owned by these companies, and heretofore operated by the C.N.R., are now definitely owned by the C.N.R. Co.

Canadian Northern Branch Lines Co.—Notice has been formally given that the amalgamation of the C.N.B.L. Co. with the Canadian Northern Ry. has been completed.

Canadian Pacific Ry.—A special interest payment at 7%, or \$3.67164 a share, will be paid, Oct. 15, on the first four instalments (\$140), from the due date of each instalment to Sept. 30, on the shares of the recent issue of \$60,000,000 ordinary capital stock, as represented by certificates of subscription, to holders of record, Aug. 18, who have paid the instalments on or before their due dates. The shares of this issue, when paid in full, will rank with the existing stock for the full dividend accruing for the quarter ending Dec. 31, payable April 1, 1914.

The directors on Aug. 11, declared a dividend of 2% on the preference stock, for the half year ended June 30, and a dividend of 2½% for the quarter ended June 30, on the common stock, the latter being at the rate of 7% per annum from revenue, and 3% per annum from interest on the proceeds of land sales and from other extraneous assets. These dividends will be paid, Oct. 1 to shareholders of record on Aug. 30.

The Royal Trust Co. has been appointed transfer agent, and the Bank of Montreal, registrar, for the company.

Central Ry. of Canada.—The case of the Hon. Jas. Domville against the company to recover \$20,000 alleged to be due as commission on the sale of certain bonds and stocks of the company, in England, was before the courts recently on an application by the company to set aside the order granting leave to sue, on the ground that there was no cause for the action in the jurisdiction under the rules, that the cause for action did not authorize the order, and that the endorsement on the writ was defective, and that in any event, the company should be furnished with particulars. The matter was taken under consideration.

Edmonton, Dunvegan and British Co-

lumbia Ry.—The dividend on the first mortgage guaranteed 4% debenture stock was paid Aug. 16.

Grand Trunk Ry.—The recent issue of £1,500,000 five year 5% secured notes due Oct. 1, 1918, in London, Eng., was reported oversubscribed. These were issued at 98, and secured by the deposit with the trustee of £2,000,000 Grand Trunk perpetual 4% consolidated debenture stock. The proceeds will be used in part payment for additional rolling stock.

A further £500,000 of similar notes, on the same terms, were issued, Aug. 15, at 98½. At that date the first issue was quoted at 1¼ premium.

Quebec and Saguenay Ry.—The stock and bonds of this company were pledged Feb. 1, 1911, to secure an issue of 13,000,000 francs of 5% 30 year French currency bonds; and in conjunction with the stock and bonds of the Lotbiniere and Megantic Ry. and the Quebec Eastern Ry., were further pledged, May 1, 1912, to secure an issue of 60,000,000 francs of 5% 30 year French currency bonds, issued by the Quebec Ry., Light, Heat and Power Co. The first issue was all taken up, and of the second issue there are outstanding bonds to the value of 10,922,000 francs. A meeting of the holders of these bonds has been called to be held, at the instance of the Quebec Savings and Trust Co. as trustee, in Montreal, Sept. 2, to consider and take action on the registration on the property of the Q. and S. Ry., "of an alleged lien or privilege for the payment of a sum of money due to the contractors in connection with construction work done on the line."

Temiscouata Ry.—Net earnings for June, \$5,515, against \$8,057 for June, 1912. Aggregate net earnings for 12 months ended June 30, \$67,404.

White Pass and Yukon Route.—Aggregate earnings for six months ended June 30, \$352,208, against \$315,769 for same period 1912.

Union Stockyards at St. Boniface, Man.—The new union stockyards at St. Boniface which are fully described on pg. 418 of this issue, were opened for business Aug. 14, the opening ceremony being performed by the Premier of Manitoba. As stated in the article referred to the sole stockholders are the C.P.R., the Canadian Northern Ry. and the Grand Trunk Pacific Ry., and no stock can be held except by a railway company. The officers and directors are:—President, J. R. Cameron; other directors:—H. H. Brewer, J. Manson; Superintendent, J. W. Buckpitt; Secretary-Treasurer, W. S. Evans. Under the terms of the act and the agreement with the railway companies, one director may be appointed for the purposes of discussion by the Manitoba Government.

The Dominion Power and Transmission Co. has ordered two 50 ft. freight cars from the Preston Car and Coach Co., and two from the Tillsonburg Electric Car Co., to replace those destroyed by fire recently. The company is arranging for the erection of new freight sheds on the same site as were those burnt, the construction of which will probably be done by the company's staff.

The North Pacific Coast Passenger Agents' Association had a conference at Vancouver, B. C., Aug. 6 and 7, W. E. Duperow, General Agent Passenger Department G. T. Pacific Ry., presiding. The next meeting will be held at Seattle, Wash., Oct. 5.

Railway Development

Projected Lines, Surveys, Construction, Betterments, Etc.

Algoma Central & Hudson Bay Ry.—Construction on the completion of this company's line to Hearst on the National Transcontinental Ry. is rapidly drawing to a close. Trains are being operated from Sault Ste. Marie to Franz, at the junction with the C. P. R., 195 miles north of Sault Ste. Marie, and to Michipicoten Harbor and the company's mines, branching off at Hawk Jct. This section was opened for traffic Dec. 1, 1912. North of Franz, grading is entirely completed through to Hearst on the National Transcontinental Ry. Track was laid to Oba at the junction with the Canadian Northern Ontario Ry. in Dec., 1912. This season this section is being ballasted, and by Oct. 1, will probably be taken over for operation. Tracklaying is progressing north of Oba, and steel is expected to reach Hearst by Nov. 1. By that time this section will be practically ballasted also, so that it is quite probable trains will be operating through to Hearst via the A.C. & H.B. Ry. by Dec. 1. Hearst is 295 miles north of Sault Ste. Marie. Oba is 50 miles south, or via the A. C. & H. B. R., it is an even 100 miles between the C. P. R. and the National Transcontinental Ry. By a rather peculiar coincidence this is the shortest distance these two railways are apart over any feasible route for the connecting line anywhere between Quebec and a point west of Fort William. It is also the only place where the Canadian Northern Ry. comes just midway between these railways, hence the A. C. & H. B. R. has secured the shortest and most direct route connecting by a cross line these three transcontinental railways with the Great Lakes. All new work on the line north of Hawk Jct., 164 miles north of Sault Ste. Marie, is constructed on a maximum 0.6% compensated grade with 6 degrees maximum curves. The Superior Construction Co., T. J. Kennedy, President and General Manager, has the contract for the work north of the C. P. R. R. S. McCormick, M. Am. Soc. C. E., is chief engineer and G. F. Horsey is District Engineer, having direct charge of the work on this section.

Burrard Inlet Tunnel and Bridge Co.—

The revised estimates of the cost of this projected bridge place its total cost, including \$100,000 for contingencies, at over \$2,500,000. The municipalities interested in its construction have subscribed \$1,500,000 in addition to which subsidies have been voted by the Dominion Government and the British Columbia Legislature. The bridge company which is formed of representatives of the municipalities, decided recently that it is impossible to raise any more money for the bridge in the locality, and to make application to the Provincial Government to take over the project. A delegation from the company waited on the Government, Aug. 4, to discuss the matter. (April, pg. 166.)

Dominion Atlantic Ry.—The work of improving the roadbed of this line, and bringing it up to C. P. R. standard, which has been in progress for a considerable time, is expected to be completed by the end of the year. The bridge work is well forward, and while it is expected to have most of it completed this year, the big bridge between Annapolis and Digby, N. S. will not be finished until the sum-

mer of 1914. The building of the substructure for this bridge was delayed considerably owing to the depth to which the foundations of one of the piers had to be carried in order to reach bed rock. (Feb. pg. 83.)

Esquimalt and Nanaimo Ry.—Tracklaying on the extension from McBride Jct., has been completed to the Little Qualicum River, eight miles. At this point an extensive trestle has to be built, for which the material is being taken in. Grading has been completed from this point to the Big Qualicum River, and there is a short piece of grading to be completed thence to Deep Bay. Grading has been completed from Deep Bay to Courtenay, and it is expected that as soon as the Little Qualicum River trestle has been built, everything will be ready for the track layers right through to Courtenay. (Aug. pg. 376.)

Fredericton and Grand Lake Coal and Ry. Co.—Tracklaying on this line between Gibson and Minto, N. B., was completed, July 30. Ballasting and other finishing up work is being pushed forward, and it is expected that the completed line will be taken over from the contractors, Sept. 30. The line is to be operated by the C. P. R., in conjunction with the New Brunswick Coal and Ry. Co.'s line, which has been taken over from the New Brunswick Government. The railway was projected by Sir Thomas Tait, for the development of the coal deposits in the Grand Lake district, and for the purpose of giving another outlet to the coalfields in the Minto district. Sir Thomas, together with D. McNicoll, Vice President, and other C. P. R. officials, made a brief inspection over the line Aug. 4. Mr. McNicoll said after the inspection: "The Gibson-Minto line will be a first class line when the contractors have finished their work and turned the road over to the company. But the other piece of line, known as the New Brunswick Coal and Ry. Co.'s line, which we have taken over from the Government wants a heap of touching up before we can say the same of it. The C. P. R. will use at least 100,000 tons of coal annually from the mines at Minto to start with, and probably as much more as can be produced." (July, pg. 331.)

Intercolonial Ry.—Surveys are being made, we are officially advised, for a reduction gradients between Point Tupper and the Sydney's, N. S., the work being in charge of J. S. O'Dwyer, Assistant Engineer, Moncton, N.B. It is expected to have the surveys completed this fall.

Tenders have been invited for a second track from St. Romuald to Chaudiere Curve, Que., 3.8 miles. There will be a number of small bridges and culverts, and an overhead crossing of the National Transcontinental Ry. There is a second track from Levis to St. Romuald, 4.3 miles. (Aug. pg. 388.)

Kettle Valley Lines.—A contract has been let to McArthur Bros., New York, for the building of the Hope Mountain section of the line, which extends from the summit of Hope Mountain down the Coquihallo River Valley to Hope, 38 miles. The contract calls for the completion of the section by Nov. 1, 1914. The construction involves very considerable rock work and several tunnels, and

is estimated to cost about \$3,000,000. F. C. Hitchcock, Vice-President and General Manager of the contracting firm, is reported to be in charge of the work, and to have established his headquarters at Hope. This section is to be built by the K. V. Lines, at the joint cost of itself and the Vancouver, Victoria and Eastern Ry., and will be used jointly by the two companies.

Construction on the uncompleted sections of the line is being pushed rapidly forward. It is expected that the substructure for the steel bridge at Trout Creek will be completed Sept. 1. This bridge will be 250 ft. long and will be at an elevation of 190 ft. Its completion will open up for the track-laying gang about 40 miles of completed grading.

The tender was accepted at a conference held, Aug. 6, between representatives of the two companies, the K. V. Lines being represented by J. J. Warren, President; A. McCulloch, Chief Engineer; and the Vancouver, Victoria and Eastern Ry. by J. H. Kennedy, its Chief Engineer, and A. Stewart, Assistant Chief Engineer, Great Northern Ry.

The contractors will start at once building a waggon road at each end of the section, at an estimated cost of \$200,000, for the purpose of getting in plant and supplies. In addition to these waggon roads, supplies will be taken by the 13 mile section of the K. V. Lines, now under construction by Twohy Bros., from Coldwater Jct. to the Hope Summit. This junction is the point at which the K. V. lines in the Nicola River Valley connect with the V. V. and E. Ry. from the Boundary and Okanagan districts. The section is to be operated jointly by the K. V. Lines and the V. V. and E. Ry., and at Hope the latter will switch off to its own route via New Westminster, while the K. V. line will go on to a junction with the C.P.R. by a bridge across the Fraser River.

Lake Erie and Northern Ry.—Work on the construction of this line from Brantford, Ont., northerly to Galt, and southerly to Port Dover, is proceeding at a rapid rate. Several hundred men are employed on grading, together with steam shovels, and very nearly half of the grading has been completed. The bridge work is also well advanced.

The Board of Railway Commissioners has approved of location plans of the line from Lorne Bridge, Brantford, station 0 to station 4.50, in Brantford City. (Aug. pg. 376.)

London and Port Stanley Ry.—Press reports state that it is likely that a vote of the ratepayers of London, Ont., will be taken towards the end of September upon the question of the electrification of the L & P.S.R. from London to Port Stanley.

The Elgin County Engineer reported to the Westminster Tp. Council, Aug. 8, that two overhead crossings of the L. & P. S. Ry. were in a dangerous condition. It is claimed that the responsibility for repairing these bridges rests with the Pere Marquette Rd., which operates the line under a lease having only a few months to run. (May, pg. 220.)

Pacific Great Eastern Ry.—It is reported that the Lonsdale estate in North Vancouver, B. C., has been secured as a station and yard site. The estate comprises 65 acres, and is near the Capilano Indian Reserve. The company is, it is said, to spend \$100,000 on the property by Dec. 31, 1915, and an additional \$400,000 by Dec. 31, 1918. The buildings proposed to be erected include all that are necessary for freight and passenger terminals, and

wharves for ocean and coastwise steamers.

It is also reported that the company is negotiating for the purchase from the Government of the Squamish Indian Reserve at the mouth of the Squamish River, near Newport, which has an area of 1,175 acres, of which the company propose to use 675 for yards and terminal purposes.

Construction is reported to be well advanced along the line from near North Vancouver to Newport, and from the end of the old Howe Sound and Northern Ry. to beyond Lillooet. F. C. Gamble, of the Provincial Government Railway Department, returned to Vancouver, recently from an inspection of the Anderson Lake-Quesnel section of the route. On this section the maximum gradient will be 1% owing to difficulties of construction. The line is being located southerly from Fort George, to a junction with the surveys working northerly.

The Premier, Sir Richard McBride, in a recent speech said that at a future date the question of extending the P. G. E. Ry. into the Yukon Basin, would be taken into consideration by the Provincial Government. (Aug., pg. 376.)

Prince Edward Island Ry.—A contract has been let by the Department of Railways, to the Roger Miller and Sons, Toronto, for the erection of the carry ferry terminals at Arleton Point, P.E.I., at an estimated cost of \$950,000. The works included in the contract were described in our July issue, pg. 232. (July, pg. 332.)

St. John and Quebec Ry.—Tracklaying has been started on what is known as the St. John Valley Ry., part of this projected railway, and it was expected to have the section from Fredericton to Gagetown, N. B., laid by Aug. 30. Ballasting is to be started at once, and it is expected to have the section completed and ready for operation by Oct. 30.

The Premier of New Brunswick, with various Provincial officers, made a trip of inspection over the northern portion of the line Aug. 8. Construction is well advanced there, and it is expected that track will be laid so as to enable freight traffic to be operated between Woodstock and Centreville by Oct. 1. To enable this to be done a temporary bridge is being built over the Meduxnakeag River. The line between Centreville and Fredericton is expected to be ready for freight traffic by Nov. 1. (July, pg. 332.)

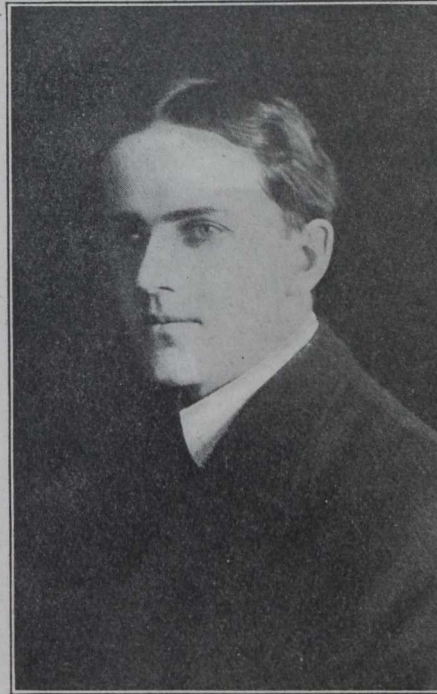
Taber Transit Co.—Fifteen cars of steel rails and a car of spikes were delivered at Taber, Alta., to the order of the company, July 25. The local council asked the company to put up a \$75,000 bond to cover liability on property damages, on the route it had applied for, viz., over Kenaston Ave., from the C. P. R. to the mines on the river. It is said that the company will abandon this route and select another one further east, in order to avoid damage to property. The steel rails delivered are 81 lbs. to the yard. Press reports state that the company proposes to build a line from Taber to Ratlaw, and that the C.P.R. has the first right to acquire the undertaking. Following are the officers and directors:—President, J. F. Kramer, Calgary; Secretary Treasurer, R. C. Baker, Taber; other directors W. E. Bullock, Taber; H. Fluck, G. S. Kramer, Philadelphia, Pa.; J. Schiesel, Calgary; C. G. Gordon, Toronto. (July, pg. 332.)

Timiskaming and Northern Ontario Ry.—The branch line from Iroquois Junction to Iroquois Falls, Ont., is reported to have been completed. (Aug., pg. 377.)

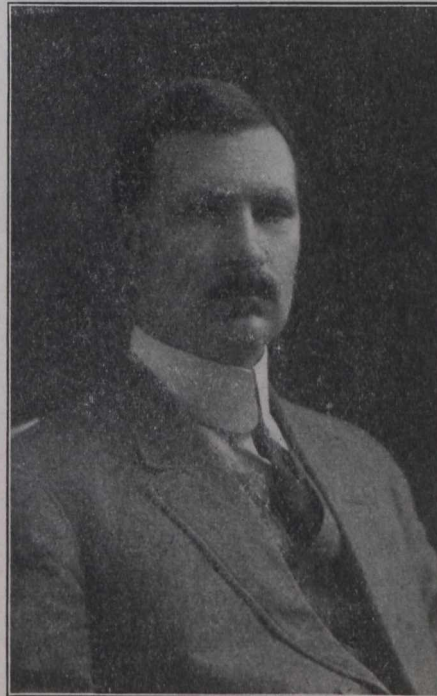
Transportation Appointments Throughout Canada.

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 announcement will confer a favor by advising us.

Canadian Car Service Bureau.—J. REILLY, heretofore Assistant Manager, has been appointed acting Manager, vice



D'Alton C. Coleman,
General Superintendent, Alberta Division,
Canadian Pacific Railway.



A. Copony,
Master Car Builder, Western Lines, Grand
Trunk Railway.

J. E. Duval, resigned to enter G.T.R. service. Office, St. Nicholas Building, Montreal.

Canadian Government Railways.—H. H. MELANSON, heretofore Assistant General Passenger Agent, has been appointed General Passenger Agent. Office, Moncton, N.B.

D. A. STORY, heretofore General Freight Agent, Intercolonial Ry., has been appointed General Freight Agent, Canadian Government Railways. Office, Moncton, N.B.

C. F. BURNS, Auditor of Disbursements, Intercolonial Ry., has been appointed Auditor of Disbursements, Canadian Government Railways. Office, Moncton, N.B.

W. H. ESTANO, Auditor of Traffic, Intercolonial Ry., has been appointed Auditor of Traffic, Canadian Government Railways. Office, Moncton, N.B.

F. E. WHELPLEY, Cashier, I.R.C., has been appointed Cashier, Canadian Government Railways. Office, Moncton, N.B.

T. C. BURPEE, M. Can. Soc. C.E., heretofore Engineer of Maintenance, has been appointed Superintending Engineer, and the first mentioned position has been abolished. Office, Moncton, N.B.

H. McM. KILLALY, B.A.Sc., M. Can. Soc. C.E., heretofore Engineer of Surveys, C.P.R., Montreal, has been appointed Engineer of Construction, Canadian Government Railways. Office, Moncton, N.B.

W. R. DEVENISH, A.M. Can. Soc. C.E., heretofore on the staff of the National Transcontinental Ry. Investigation Commission, has been appointed Division Engineer, Canadian Government Railways. Office, Moncton, N.B.

Canadian Northern Quebec Ry., Quebec and Lake St. John Ry.—W. R. BOON, formerly Bridge and Building Master, District 2, Eastern Division, C. P.R., has been appointed Bridge and Building Master, C.N.Q.R. and Q. & L. St. J.R., vice G. Seaman, resigned. Office, Joliette, Que.

Canadian Northern Ry.—I. L. BOOMER, Trainmaster, has been appointed acting Superintendent, District 3, Western Division, during the absence of J. G. Entwistle, on leave for two months. Office, Edmonton, Alta.

Canadian Pacific Ry.—J. M. GIBBON, heretofore Advertising Agent, London, Eng., has been appointed General Publicity Agent, vice W. T. Robson, resigned. Office, Windsor St. Station, Montreal.

Arthur Piers, heretofore Manager of Steamship Lines, Liverpool, Eng., having retired on account of ill health, H. MAITLAND KERSEY, at one time, Agent, White Star Line, New York, has been appointed Manager in Chief, C.P.R. Trans-Atlantic and Trans-Pacific Steamship Lines. All officers connected with the maintenance and operation of the steamships report to him. Office, 8 Waterloo Place, London, En.

E. E. LLOYD, heretofore Assistant Auditor of Stores and Mechanical Accounts, has been appointed Auditor of Stores and Mechanical Accounts, vice A. A. Goodchild, promoted. Office, Montreal.

S. B. McCONNELL, heretofore Assistant Engineer, Montreal, has been appointed Division Engineer, Lake Superior Division, vice J. W. Orrock, promoted. Office, North Bay, Ont.

J. F. RUGG, heretofore Locomotive Foreman, Neudorf, Sask., has been appointed Locomotive Foreman, Minnedosa, Man., vice W. J. Andrews, transferred.

W. J. ANDREWS, heretofore Locomotive Foreman, Minnedosa, Man., has been appointed Locomotive Foreman, Neudorf, Sask., vice J. F. Rugg, transferred.

W. W. WEBSTER, heretofore acting District Master Mechanic, Kenora, Ont.,

has been appointed District Master Mechanic, Medicine Hat, Alta.

G. MOTH, heretofore Road Foreman of Locomotives, Macleod, Alta., has been appointed District Master Mechanic, District 1, British Columbia Division, vice M. J. Scott, promoted. Office, Revelstoke.

C. A. COTTERELL, heretofore Trainmaster, Vancouver, B.C., is reported to have been appointed Superintendent, District 2, British Columbia Division, vice G. E. Graham, resigned to become General Manager of the Coquitlam Terminal Co. Office, Vancouver.

W. P. MARTIN, heretofore Wharf Agent, Vancouver, B.C., is reported to have been appointed Trainmaster, District 2, British Columbia Division, vice C. A. Cotterell, promoted. Office, Vancouver.

LINCOLN SMITH, heretofore chief clerk to Manager, British Columbia Coast Steamship Service, Victoria, B.C., has been appointed Assistant to the Manager, same service. Office, Victoria, B.C.

E. C. GILL is reported to have been appointed Advertising Agent, London, Eng., vice J. M. Gibbon, promoted.

Duluth, Winnipeg and Pacific Ry.—J. H. ELLIOTT has been appointed Superintendent, vice C. J. Wilson, resigned. Office, Virginia, Minn.

Grand Trunk Pacific Ry.—J. L. HODGSON, heretofore Master Car Builder, Western Lines, G.T.R., Port Huron, Mich., has been appointed Master Car Builder, G.T.P.R. Office, Transcona, Man.

E. HACKING has been appointed Car Foreman at Transcona, vice J. B. Shelton.

R. N. CARD, heretofore chief clerk to Commercial Agent, Vancouver, B.C., has been appointed City Freight Agent, vice A. Davidson, transferred. Office Vancouver, B.C.

The following agents have been appointed:—G.T.P. Jct., Man., D. Miller; Dugald, Man., P. Chausse; Lestock, Sask., M. G. Billings; Bashaw, Alta., D. C. McCready; New Hazelton, B.C., F. A. Wildmayer; Terrace, B.C., J. E. Lalonde; McBride, B.C., L. C. Pearson; Morricetown, B.C., H. H. Boggs.

Grand Trunk Ry.—J. E. DUVAL, heretofore Manager, Canadian Car Service Bureau, Montreal, has been appointed General Superintendent of Car Service, G.T.R. Office, Montreal.

The positions of General Superintendent of Transportation, heretofore held by D. CROMBIE, who has left the service; Superintendent of Passenger Service, heretofore held by F. PRICE; and Superintendent of Freight Service, heretofore held by W. H. FARRELL, have been abolished.

F. PRICE, heretofore Superintendent Passenger Service, has been appointed Superintendent Car Department. Office, Montreal.

J. B. McLAREN, heretofore chief clerk to Auditor of Freight Accounts, has been appointed Auditor of Freight Accounts, vice J. D. McLennan, assigned to other duties. Office, Montreal.

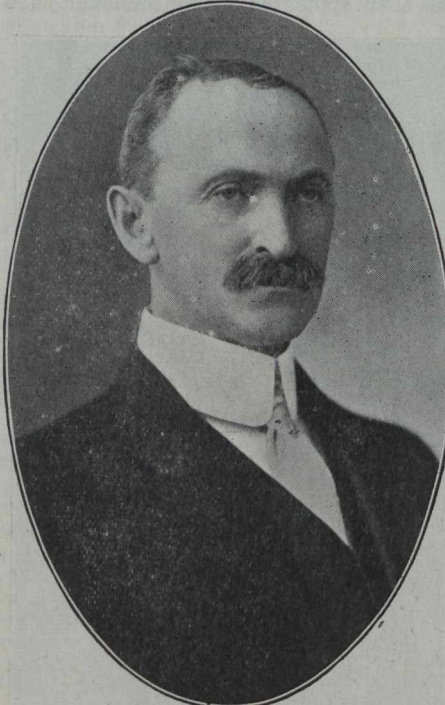
J. D. McLENNAN, heretofore Auditor of Freight Accounts, Montreal, has been appointed a Travelling Auditor. Headquarters, Montreal.

G. BRADSHAW, safety Engineer, Highland, N.Y., has been appointed to introduce the Safety First System on the G.T.R.

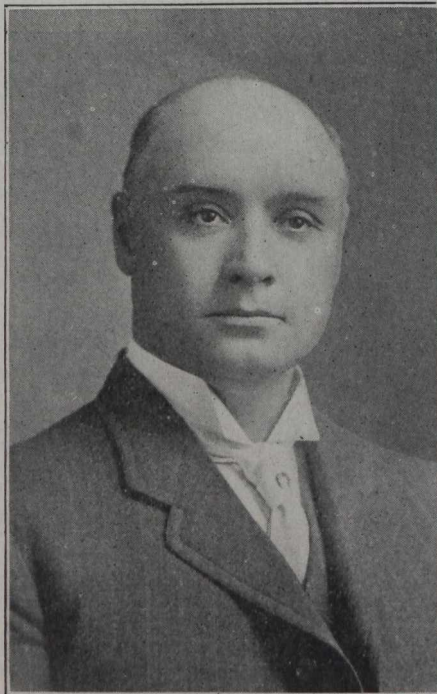
T. CUSHING, heretofore Trainmaster, District 3, Montreal Division, Eastern Lines, Richmond, Que., has been assigned to other duties.

J. W. FARRELL, Trainmaster, District 2, Montreal Division, Eastern Lines, Island Pond, Vt., has had his jurisdiction extended over District 3, and his office removed to Richmond, Que.

T. H. MASON has been appointed Trainmaster, District 4, Montreal Division, Eastern Lines, vice A. D. McCarthy, resigned. Office, Montreal.



T. G. Armstrong,
Assistant Master Car Builder, Western Lines,
Canadian Pacific Railway.



J. McMillan,
General Superintendent of Telegraphs, Western
Lines, Canadian Pacific Railway.

W. H. FARRELL, heretofore Superintendent of Freight Service, Montreal, has been appointed Superintendent, Toronto Terminals, vice G. A. Stokes, assigned to other duties.

G. A. STOKES, heretofore Superintendent, Toronto Terminals, has been appointed Division Agent, Ontario Lines, with jurisdiction over station agents, etc.,

and such other duties as may be assigned to him, reporting to the General Superintendent. Office, Toronto. This is a new position.

P. C. HEELS, heretofore Roadmaster, Gravenhurst, Ont., has been appointed Supervisor of Track there, vice T. H. Horner, transferred.

W. T. WINDER, heretofore Accountant, G.T.R. and Wabash Rd., St. Thomas, Ont., has been appointed Travelling Accountant, Ontario Lines, G.T.R.

A. COPONY, heretofore Chief Draughtsman, Car Department, Montreal, has been appointed Master Car Builder, Western Lines, vice J. L. Hodgson, transferred to G. T. Pacific Ry. service. Office, Port Huron, Mich.

The following agents have been appointed:—Hemmingford, Que., G. Williamson; Edgington, Que., A. H. Johnston; Gananoque Jct., Ont., V. E. Parker (acting); Uthoff, Ont., V. H. Fisher; North Bay, Ont., Passenger, J. H. Meighen; Colwell, Ont., L. A. Hill; Thornbury, Ont., H. E. Emery; Winona, Ont., W. W. Langford; Belle River, Ont., C. J. Forrest; Canfield Jct., Ont., W. A. H. Hayes; Welland Jct., Ont., F. J. Foster; Clifford, Ont., W. J. Kyle; Golden Lake, Ont., D. J. Macintosh; Otter Lake, Ont., J. Summerville; Rose Point, Ont., J. J. White.

Intercolonial Ry.—D. M. CONDON, heretofore acting District Passenger Agent, has been appointed District Passenger Agent, Halifax, N.S.

L. S. BROWN, heretofore Assistant Superintendent, Moncton and Ste. Flavie District, Newcastle, N.B., has been appointed Superintendent, Truro, Sydney and Oxford District, vice Y. C. Campbell, assigned to other duties. Office, New Glasgow, N.S.

Y. C. CAMPBELL, heretofore Superintendent, Truro, Sydney and Oxford District, New Glasgow, N.S., has been appointed Claims Agent for the district from Halifax to Sydney. Office, New Glasgow, N.S.

H. H. SCHAEFER, heretofore Division Freight Agent, St. John, N.B., has been appointed Division Freight Agent, in charge of territory in New Brunswick, Moncton, north and east. Office, Moncton, N.B.

R. S. RICHARDSON, has been appointed Assistant Superintendent, Halifax and St. John District, vice H. B. Fleming, transferred. Office, Moncton, N.B.

S. G. TIFFIN, heretofore General Agent, Toronto, has been appointed Division Freight Agent, in charge of territory in New Brunswick, west of Moncton. Office, St. John, N.B.

W. R. FITZMAURICE, heretofore station agent, Amherst, N.S., has been appointed Assistant Superintendent, Moncton and Ste. Flavie District, vice L. S. Brown, promoted. Office, Newcastle, N.B.

H. B. FLEMING, heretofore Assistant Superintendent, Moncton, N.B., has been appointed Assistant Superintendent, National Transcontinental Ry., between Moncton and Edmundston, N.B., which is being operated by the I.R.C.

See also Canadian Government Railways.

Prince Edward Island Ry.—W. T. HUGGAN, Accountant and Auditor, Charlottetown, P.E.I., is reported to have been appointed District Passenger Agent there.

See Canadian Government Railways.

Quebec, Montreal and Southern Ry., Napierville Jct. Ry.—A. L. CURRIE has been appointed Secretary, vice L. J. Beique, resigned.

Canadian Pacific Railway Construction, Betterments, Etc.

Eastern Division.—Considerable progress has been made with the second track work between St. John's and Farnham, Que., and it was reported, Aug. 9, to be almost completed, but for the bridge at St. John's. The concrete substructure has been put in, but nothing has been done at the superstructure.

Work is in progress on the erection of the second of the final two large spans on the bridge across the St. Lawrence River at Lachine, Que. As soon as the first of these is placed in position, the second will be ready to be floated out. It is expected the bridge will be finally completed as a double track bridge this fall. An illustrated descriptive article of this bridge appeared in our issue of Feb., 1912, and a further article on pg. 397 of our Aug., 1912, issue.

Campbellford, Lake Ontario and Western Ry.—An original of the mortgage of the line to the Royal Trust Co., as trustee for the bond issue, has been deposited with the Secretary of State at Ottawa.

Construction trains are at work ballasting the line easterly from Agincourt, the ballast being obtained from a new pit near Markham. The work has been practically completed as far as Port Hope. The bridge work east of Port Hope is being pushed forward, and it is expected that everything will be ready for the operation of the line before the end of the year.

Ontario Division.—In connection with the building of the Campbellford, Lake Ontario and Western Ry., which joins the present Montreal-Toronto line at Agincourt, a second track is being built from the point of junction into Toronto. The work involves the building of two new single track bridges over the Don and the West Don respectively, and the reduction of the present gradient between Wexford and Donlands.

A permit has been granted for the erection of a new repair shop at West Toronto, at an estimated cost of \$26,000. The contract for the work has been let to John Hayman and Son, London, Ont.

Track laying was started, Aug. 18, west of Islington on the second track being built from that point to Guelph Jct. The grading is fully completed to west of Cooksville. Between this point and Streetsville there are some good sized cuts and fills, on which considerable progress has been made. From Streetsville to Guelph Jct. the work is also well advanced. The concrete work is in a forward state. The whole work will be finished this fall.

Manitoba Division.—The Board of Railway Commissioners has approved of location plans for the extension of the branch line now terminating at Gimli, northerly to Riverton, Man., 26.05 miles.

The Board of Railway Commissioners has approved of location of the Snowflake westerly branch for 9.10 miles from sec. 19, tp. 1, range 9, westerly to sec. 14, tp. 1, range 11.

Saskatchewan Division.—A contract is reported to have been let to Grey and Co., Minneapolis, Minn., for the laying of 3.5 miles of pipe line at Weyburn, Sask., to extend from the Souris River to the C.P.R. yards, and to provide a water supply for the company's purposes. Local press reports state that 20 acres has been purchased at Weyburn, on which to erect divisional shops, etc., on the Weyburn-Lethbridge line.

The second track work between Swift Current and Moose Jaw, Sask., is

nearing completion. In connection with this work about 15 miles of additional tracks are being laid in Moose Jaw yards.

Alberta Division.—Press reports state that surveys are being made for a line from near Cottonwood, Mont., northerly to a junction with the Weyburn-Lethbridge line, now under construction, at Mannyberries, Alta. The survey party is reported to have staked a line entering Canada near Wild Horse Lakes, along the Lost River Coulee, and on to the Lake Pakewki flats. Cottonwood is on the Minneapolis, St. Paul and Sault Ste. Marie Ry., and C.P.R. subsidiary, and its engineers are reported to have made the surveys south of the International boundary, C.P.R. engineers making the surveys in Canada.

The second track work on the Broadview section has been completed through the Broadview yards, and work has been started on the subway at Tenth Ave. This structure will be of steel and concrete and is estimated to cost \$65,000.

Steel has been laid to Skiff, on the Weyburn-Lethbridge Branch, and it is expected that Eudon, 60 miles east of Stirling, will be reached this season. Ballasting trains are being run to Skiff. It is expected that the section of the line under construction westerly will connect up with the section from the east, in the fall of 1914. (Aug., pg. 378.)

Equipment of Locomotives With Steps.

—The Board of Railway Commissioners has issued the following circular:—"The Board's inspectors have called its attention to the fact that a number of railway companies subject to its jurisdiction are equipping their locomotives with steps on the front buffer beam, or on the side post of the pilot, in accordance with Interstate Commerce Commission regulations. The Canadian regulations, agreed to by the railway companies and approved by the Board, Feb. 17, 1913, do not require these steps. If, on account of international service, Canadian railway companies feel that it is desirable or advisable so to equip their locomotives in accordance with United States practice, the Board directs that it shall be incumbent upon such railways to see that these steps are kept in good order and repair."

Canadian Freight Association, Western Lines.—At the annual meeting in Winnipeg, Aug. 7, the following officers and standing committees were elected for the current year.—President, W. C. Bowles, C.P.R.; Vice President, G. Stephen, C.N.R.; executive committee, W. C. Bowles, G. Stephen and A. Rosevear; inspection committee, W. G. Manders, G. H. Smith, F. R. Porter, P. H. Burnham; car service committee, A. Hatton, J. P. Driscoll, T. P. White, W. B. Harris; classification committee, W. B. Lanigan, G. Stephen, A. E. Rosevear, W. G. Manders, F. R. Porter, P. H. Burnham, W. C. Bowles.

An Old Subscriber's Appreciation.—John L. Hodgson, who has recently been appointed Master Car Builder, Grand Trunk Pacific Railway, at Transcona, Man., has taken Canadian Railway and Marine World for many years. A short time ago he wrote: "I am very glad indeed to be a subscriber to Canadian Railway and Marine world, for the information it contains is very interesting. I look forward each month to receiving it and enjoy reading it."

Canadian Northern Railway Earnings, Etc.

Gross earnings, working expenses, net earnings, increases, or decreases, compared with those for 1911-12, from July 1, 1912:—

	Gross Earnings	Expenses	Net Earnings	Increase or Decrease
July	\$1,829,700	\$1,335,100	\$494,600	\$133,000
Aug.	1,745,800	1,375,000	270,800	56,100
Sept.	1,671,500	1,248,000	423,500	4,100
Oct.	2,351,200	1,645,900	705,300	24,000
Nov.	2,509,700	1,631,900	877,800	212,800
Dec.	2,132,000	1,551,000	581,000	77,200
Jan.	1,513,400	1,243,200	270,200	45,500
Feb.	1,338,700	1,130,200	208,500	30,900
Mar.	1,685,900	1,254,400	431,500	4,700
Apr.	1,745,300	1,242,200	503,100	100,000
May	2,218,400	1,638,200	580,200	122,100
June	2,178,200	1,635,700	542,500	120,800
	\$22,979,800	\$16,930,800	\$6,049,000	\$932,900
Incr.	\$3,441,200	\$2,508,300	\$932,900

Mileage in operation during June, 4,316, against 4,297 in June, 1912; average mileage in operation during the year ended June 30, 4,229, against 3,888 during the previous year.

Approximate earnings for July, \$1,928,800, against \$1,829,700 for July, 1912.

Canadian Pacific Railway Earnings, Etc.

Gross earnings, working expenses, net earnings, increases or decreases, compared with those for 1911-12, from July 1, 1912:—

	Gross Earnings	Expenses	Net Earnings	Increase or Decrease
July	\$12,052,398.58	\$7,604,921.68	\$4,448,476.90	\$745,148.57
Aug.	12,251,715.87	7,533,790.21	4,717,925.66	642,354.65
Sept.	11,579,733.98	7,329,430.13	4,250,303.85	332,857.05
Oct.	13,060,397.80	7,999,510.61	5,060,887.19	379,782.44
Nov.	12,362,666.42	8,104,527.38	4,258,139.04	270,772.55
Dec.	12,219,278.72	7,823,559.21	4,395,719.51	289,989.25
Jan.	9,679,607.39	8,017,233.61	1,662,373.78	579,516.08
Feb.	9,747,685.55	7,227,616.21	2,520,069.34	136,202.67
Mar.	11,111,892.78	7,256,475.89	3,855,416.89	137,015.78
Apr.	11,750,913.45	7,805,835.90	3,945,077.55	x170,674.24
May	11,904,979.02	8,400,949.16	3,504,029.86	176,485.37
June	11,674,430.42	8,046,675.84	3,627,754.58	x218,848.11
	\$139,395,699.98	\$93,149,825.83	\$46,245,874.15	\$2,947,631.32
Incr.	\$16,075,158.75	\$13,128,527.43	\$2,947,631.32

Approximate earnings for July, \$11,555,000, against \$11,641,000 for July, 1912.

Commencing Aug. 1, the mileage under operation was increased to 11,641.

Grand Trunk Railway Earnings, Etc.

Subject to audit, the accounts for the half year ended June 30, show the following results:—

Gross receipts	\$21,260,472
Working expenses	15,618,577
Net receipts	\$5,641,895
Deduct debit balance on account of rentals, outside operations and car mileage	374,990
Total net revenue	\$5,266,905
Net revenue charges, less credits	2,589,866
Balance	\$2,677,039
Deduct, Canada Atlantic Ry. deficiency	\$360,380
Deduct, Detroit, Grand Haven and Milwaukee Ry. deficiency	373,042
	733,422
	\$1,943,617

This surplus of \$1,943,617 added to the balance of \$62,336, from Dec., 1912, makes a total of \$2,005,953 available for dividend, which will admit of the payment of the full dividend for the half year on the 4% guaranteed stock and first and second preference stock, leaving a balance of about \$78,407 to be carried forward.

The accounts of the G.T. Western Ry. for the year ended June 30, after providing for all fixed charges, including the debit balance of \$78,621 brought forward from the previous year, show a deficit of \$111,280, which is carried forward to the debit of the current half year.

TRAFFIC RECEIPTS OF THE SYSTEM.

	1913	1912	Increase
Aggregate from July 1 to July 31:			
G.T.R.	\$3,976,418	\$3,680,098	\$287,320
C.A.R.	229,158	197,186	31,972
G.T.W.R.	632,632	573,014	59,618
D.G.H. & M.R.	207,350	185,752	21,598
Totals	\$5,045,558	\$4,645,050	\$400,508

Grand Trunk Pacific Railway Earnings.

The earnings of the Prairie Section and Lake Superior Branch for July, were \$519,556.

THE CANADIAN GENERAL ELECTRIC Co., Ltd., has issued a folder on Desert Connectors, for which it is now agent.

Electric Railway Department.

The Development of the Montreal and Southern Counties Railway.

The Montreal and Southern Counties Ry. started operations in Nov., 1909, to give interurban service from Montreal, across the St. Lawrence River, to the southern townships and counties, and in accordance with the company's policy to extend its service in the above suburban districts, under the direction of Bion J. Arnold, of Chicago, it has just completed the rehabilitation of its 600 volt, direct current lines from Montreal, via St. Lambert, to Longueuil and to the Montreal Country Club at St. Lambert, and the extension of them to Richelieu through Chambly and Rouville counties. The company's plans contemplate placing the best procurable facilities at the service of the travelling public and the producers in the territory within a radius of 75 miles from Montreal, and the next points to be reached will be Boucherville, La Prairie, Marieville, St. Cesaire, Granby and Waterloo.

The service hitherto supplied this locality by the previously existing roads, while all that could be expected under the old system of operation, has not been

the Country Club to La Prairie, 4 miles, through the counties of Chateauguy and Huntingdon, 50 miles, and from Richelieu to Sorel are yet in a tentative stage.

The line crosses the St. Lawrence River on the Victoria Jubilee Bridge beside the G.T.R. double tracks, and diverges at the east end, the Longueuil branch passing directly through St. Lambert, where are located the car barns and one of the sub stations, while at Front St. the branch to the Country Club and beyond is depressed to pass the steam road.

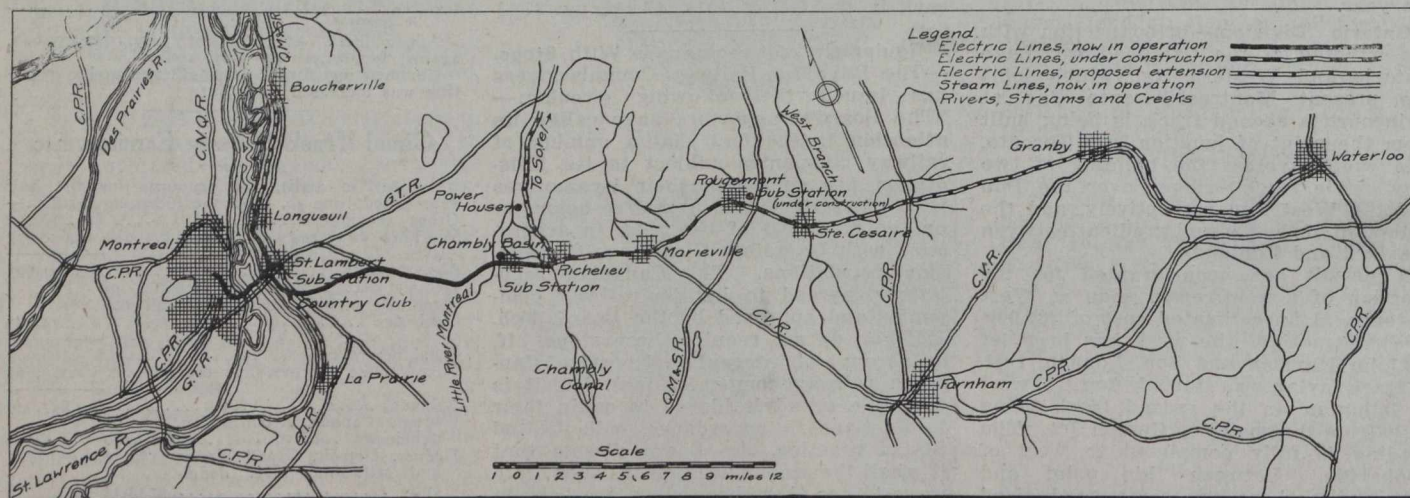
After passing the G.T.R. over the interlocking crossing at the Country Club, the line is now continuous to Richelieu, which is reached over the Central Vermont Ry.'s right of way, after passing Greenfield Park. About 12 miles of the steam line has been electrified and brought up to the new standard. The intermediate 3 mile stretch between Greenfield Park and the Country Club is entirely new, and has been necessitated by the extensive enlargement of the G.T.R. yards projected at St. Lam-

future to permit carrying passengers to a more convenient terminal on the Place D'Youville.

The structures put up for the interurban electric railway include at present the following buildings:—Sub stations at St. Lambert and Chambly; passenger stations at Montreal, St. Lambert and Longueuil; car barns at St. Lambert; shelters at waiting stations other than the stations mentioned.

The situation and requirements of this interurban electric system are such that power from the Montreal Light, Heat and Power Co.'s plant, in the neighborhood of the Richelieu River, can be used to good advantage, and, accordingly, sub stations have been located at two points about 14 miles apart on the interurban line. With continuity of power service and reasonable rates assured, simplification by the elimination of an individual power house is obviously a considerable advantage.

The site of the Chambly Basin sub station is not far from the hydro-electric power plant. The building is 34 ft. 10



Route and Connections of Montreal and Southern Counties Railways.

able, perhaps, to entirely meet the demands of the district, which require convenient connection with trains and lowered transportation cost, as well as speed. The character of the territory is recognized as being such as to necessitate this improved service. The agricultural values compare favorably with those in other sections and dairy resources are considerable. Many people from across the St. Lawrence are attracted by the natural beauties of the country and there are already located, either actually or prospectively, desirable industrial plants at certain favorable points.

ROUTE.—From the original Montreal terminal at McGill and Youville Sts., the system has 23.3 miles of track, connecting St. Lambert, Longueuil, the Montreal Country Club, Greenfield Park, Chambly Basin and Canton, and Richelieu. With the additional 26.7 miles on which are next to be included Marieville, Rougemont, St. Cesaire, Abbotsford and Granby, there will be a total of 50 miles in service. Projected lines from Longueuil to Boucherville, 5 miles, from

bert, around which the interurban road has had to pass.

At Richelieu the line crosses the Richelieu River and the adjacent Chambly Canal, at which is located the Montreal Light, Heat and Power Co.'s hydro-electric power station.

Beyond Richelieu the Central Vermont Ry.'s existing right of way through Marieville branching to Rougemont and St. Cesaire, 13 miles, will be electrified. The road will be extended by new construction through the mountain district via Abbotsford to Granby, 15 miles.

The right of way into Montreal occupies the Harbor Commissioners' land east of Point St. Charles freight yard, and has been brought within the G.T.R.'s property as far as the pump house on the spill way near Mill St. Traversing the Government property adjacent to Lachine Canal basin, it crosses the latter on Black's Bridge, and thence via Common and Grey Nun Sts. reaches the original Y terminal at McGill St., as permitted by the city legislation of 1908. It is expected this may be revised in the near

ins. by 42 ft. 4 ins. inside, with concrete foundations, floors, sills, coping and roof—the latter a permanent second floor with cinder concrete fill—covered with composition roofing, and supported on steel I beams, a C.I. column and the brick walls. The tower section is 32 ft. high over all.

The sub station in the group of buildings at St. Lambert, similar in construction to the other station, is 50 by 80 ft. inside, with a 20 by 20 ft. balcony room, and a 14 by 20 ft. oil room additional. Steel trusses and columns support the roof.

The original 3 track car barn at St. Lambert, having a capacity of nine 50 ft. cars, has been supplemented by the new 200 by 55 ft. brick structure, to which there are four entering tracks, making the total capacity under cover at present 25 cars. Inspection and repair pits are located under one track in the old barn and two in the new barn.

Here are located also, in a 125 by 30 ft. annex to the new barn, the general offices, dispatcher's headquarters, locker

rooms for the crews, and store house.

The principal stations at the Youville St. terminal, Montreal, St. Denis St., St. Lambert, Longueuil, Chambly Basin, Chambly Canton and Richelieu, are supplemented by additional waiting rooms at the junction on Front St. in St. Lambert, Montreal South, and at the Country Club. More shelters will be built at such points as may be required by traffic over the new extension. These stations and waiting rooms are frame structures of the standard interurban road type, to accommodate passengers and express freight.

Within the Montreal city limits the line passes over Lachine Canal on Black's Bridge and then crosses the St.

to complete the overhead circuit, while the two track ends are connected by two bare 350,000 c.m. copper cables laid, as are the lead covered feeder cables across the canal underground.

Just beyond this point the line crosses the 725 ft. Richelieu River wood trussed deck bridge of seven spans, 103 ft. 7 in. centre to centre of piers, erected also by the steam road. There is no traffic to require a swinging section here, and the rails are carried on top of the trusses 29 ft. above normal water level.

CONNECTIONS.—The 8½ miles of track of the company's first lines, extending from Montreal to Longueuil and the Country Club via St. Lambert, are 56¼ in. gauge, using 80 lb. rails, on oak

turnouts between St. Lambert and those at Longueuil and the Country Club stations, as well as Chambly Canton, Richelieu and Brookline.

The grades are light, nowhere more than about 1½% and averaging 0.305%, not considering the 3½% at the 550 ft. east approach to the Victoria Jubilee Bridge. On this bridge the roadway rises 24 ft. between the end abutments and the bridge centre, a 0.658% grade, 3,500 ft. long on either half. At Grey Nun St., Montreal, the rails are 3½ ft. lower than the surface of Lachine Canal. The Chambly Basin turnout, beside the sub station, is 23 ft. lower than the high water level of Richelieu River. In the 3 miles between the top of the watershed of the St. Law-



Montreal Terminal Station.



St. Lambert Station.

rence River over the 7,000 ft. Victoria Jubilee Bridge, which was erected in 1897 to replace the old square, steel tube, single track structure of the Robert Stevenson design. This is a double track through bridge of 25 Pratt truss steel spans, resting on stone piers, averaging 280 ft., centre to centre, and while erected primarily by the G.T.R. to carry its steam tracks, allowance was also made for the support of 15 ft. driveways on the cantilever ends of the floor beams extending either side of the 30 ft. portals, and upon one of these ways are now accommodated both pedestrians and the electric cars, although the loading of the structure is such as to limit the weights

ties and gravel roadbed. Little overhauling has been required on the roadbed, except some rebalasting, and owing to the flatness of the country east of the St. Lawrence River, grading and filling have been of small extent, chiefly confined to the 3 miles of Golf Club-Greenfield Park new construction, beyond which the line occupies the Central Vermont track. At St. Lambert car barn the tracks have been relaid to secure more direct entrance to the barns, and passage to the Longueuil Branch. Double track is contemplated between this station and the Front St. junction point. The tracks within the new barn total 800 ft., those in the old, 480 ft., while

rence and Richelieu Rivers, and the Chambly Basin level, there is a difference of elevation of less than 50 ft., a mean gradient of 0.15%.

A special interlocking plant has been installed near the Country Club, where the line crosses the G.T.R. main double tracks. This interlocking plant was installed by the Railway Signal Company of Canada, and is unique in being the most complete plant in Canada for protecting an electric railway crossing. The interlocking machine itself is a 24 lever improved Saxby Farmer type, which is housed in a 2 story frame tower building of standard construction, the machine being located on the second floor. The



St. Lambert Sub Station.



Chambly Sub Station.

of the 8 ft. 1 in. by 49 ft. 4 in. cars to 65,000 lbs. each. At its centre span the lower chord of the bridge is 24 ft. above those at the end abutments, and at these points the rails are 99½ ft. above the water in Lachine Canal, totalling about 65 ft. at the greatest rail elevation above the St. Lawrence River.

The 126 ft. steel span over the Little River Montreal, about 10 miles east of St. Lambert, and the 90 ft. steel girder swing bridge at Chambly Canal were first put up for the Central Vermont Ry. The rails on the Chambly Bridge are only 6½ ft. above the canal water, and as there is considerable traffic on the canal, the construction of cross braced wooden towers at either end has been required

the yards have about 300 ft. more available for storage, aggregating 1,600 ft. There are considerable stretches of single tangent track, notably one of 7 and two of 2 miles each, on the Central Vermont right of way from Greenfield Park to Chambly Canton and shorter lengths between St. Lambert and Longueuil, the Country Club and Montreal, in all about 65% of the present system.

There are sidings in Montreal at Common St., Riverside St., and the west approach to the Victoria Jubilee Bridge; the one near the Front St. subway, St. Lambert, soon will be included in the double track to connect it with the St. Denis St. siding in front of the car barns. There are also intermediate sidings or

entire plant is according to the Railway Signal Association's latest approved recommended practice. The leadout is of the box crank type, and the signals are all of the upper quadrant type.

All derails on both lines are operated by no. 8 switch lock movement, and the junction switch on the electric line is locked by a facing-point lock. All home interlocking signals are equipped with 2 arms, the lower arm in each case being fixed. Power distance signals are used on the G.T.R. No distance signals are used on the electric line, because track curvature and operating requirements necessitate slow speed movement through the plant. All signals are bolt locked with the derails and switches of the route

which they govern. All crossing frogs are of manganese steel.

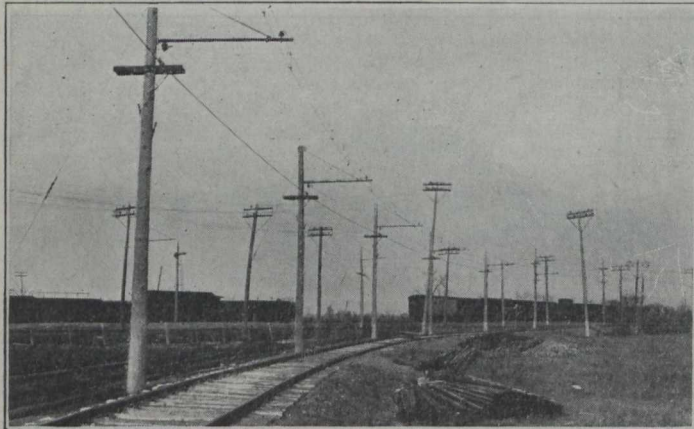
In addition to the above complete interlocking plant, there is another crossing of the G.T.R. tracks at Riverside, near the Victoria Bridge. This crossing is controlled by plant which is only interlocking for the electric line. Signals only are used on the steam tracks. Steam road crossings in Montreal other than the above are such as to necessitate only ordinary care by motormen and conductors in negotiating them.

On the new constructions were used 60-lb. A.S.C.E. section Dominion rails and splice angle bars. Pennsylvania splice bars, style D1 were used on the old 56-lb. rails of the Central Vermont Ry., permit-

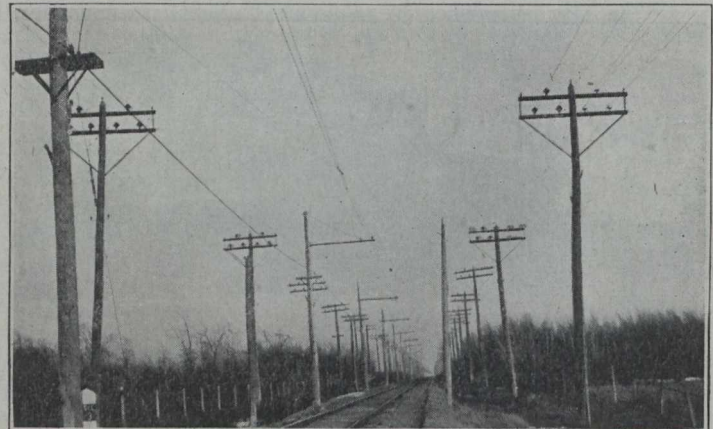
real over the Victoria Jubilee Bridge. This practically certain source of energy is tapped in duplicate at St. Lambert and Chambly, 14 miles apart, and is transformed in the Montreal and Southern Counties sub stations at these points to lower voltage and converted into 600 volt direct current, which is distributed to the trolley wires over bare aluminum feeder cables. The system, lying in Montreal, St. Lambert and the Longueuil and Country Club branches, which originally was supplied from steam power plant in the G. T. R. yards at Point St. Charles, Montreal, is now supplied directly from the St. Lambert sub station.

OVERHEAD CONSTRUCTION.—The overhead construction on the three mile

ported on porcelain insulators, which are fastened to 10 ft. T iron brackets attached to the poles. The bracket type of construction is used throughout the line, except over the double track at Richelieu station, Chambly Canton and two short curves near Chambly Canton and through the streets of Greenfield Park subdivision. At these points the messenger wire is supported by cross spans, using $\frac{3}{8}$ in. 7 stranded steel cable and pole type porcelain strain insulators. The miscellaneous overhead material is all galvanized or sheradized and was supplied by the Ohio Brass Company. The hard drawn trolley wire was supplied by the E. F. Phillips Electrical Works, the Imperial Wire & Cable Co.



Overhead Construction at Junction With C.V.R.



Tangent Construction at Three Mile Post, C.V.R.

ting bonding at joint, crossings and turnouts with 4/0 B. & S. gauge flat laminated ribbon copper 5-32 in. wide, with 7-8 in. diameter solid soft copper terminals 10 in. centre to centre when tucked. 2/0 B. & S. gauge solid cross bonds 70 in. long, with solid soft copper terminals cross connect the rails at intervals corresponding to the feeder taps. The track return circuit is connected to the negative bus bars at the switchboards of sub

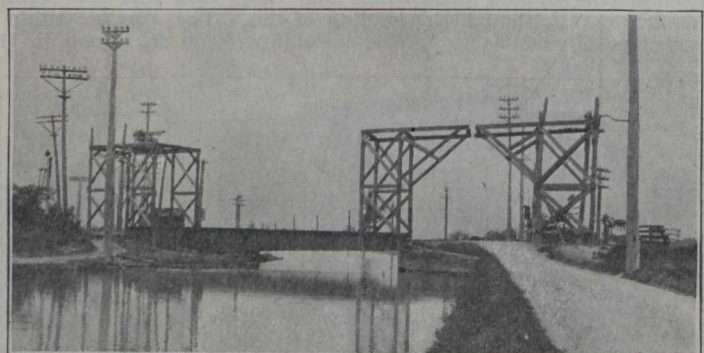
extension of new track through Greenfield Park, as well as the electrification of the Central Vermont Ry. tracks as far as Richelieu, is notable as being the first installation of the catenary type of overhead construction to be built in this part of Canada. The standard type of catenary construction is used throughout, consisting of 7-16 in. Siemens-Martin grade 7 strand galvanized steel messenger cable, from which is hung at

and the Canada Wire & Cable Co. Special steel messenger cable was supplied by the Steel Company of Canada. All the overhead construction is hung to allow 22 ft. clearance from the trolley wire to the top of rail along the track, with 23 ft. clearance at railway crossings.

The trolley wire is supplemented along the entire length by bare aluminum feeder, having a conductivity equal to 500,000 c.m. copper cable. This feeder



G.T.R. Crossing Near Country Club.



Construction at Chambly Canal Bridge.

stations, while the lightning arresters are grounded at Chambly and at St. Lambert sub stations in a 4 ft. square no. 10 tinned copper plate, buried in permanently moist earth, with 2 ft. of crushed charcoal above and below. Subgrade on the single track line is 8 ft. wide. Ballasting is gravel as on the earlier construction.

TRANSMISSION.—From its hydro electric power station at Richelieu the Montreal Light, Heat and Power Co.'s duplicate transmission pole lines carry 3 phase 63 cycle alternating current of approximately 22,000 volt directly into Montreal, there being a pole line on each side of the track along the Central Vermont Ry. right of way from Chambly Canton, through St. Lambert, directly into Mont-

intervals of approximately 13 ft. 8½ ins. on tangents no. 4/0 B. & S. gauge American standard grooved hard drawn copper trolley wire. The hangers are of the floating type, especially designed to neutralize the shocks on transit, and each consists of a three bolt malleable iron Detroit type of ear to which is rivetted $\frac{3}{4}$ in. wide, $\frac{1}{8}$ in. thick strap iron hanger. Thirty-five feet, 7 and 8 in. top cedar poles are used, which are spaced 110 ft. on tangents and 100 on curves. There are clearances of 9 ft. from centre of track to centre of pole, which allows 5 ft. 11 ins. from inside of rail to side of pole and 4 ft. 4 ins. from side of pole to side of car when passing along the track. Messenger wire is sup-

gives a capacity more than enough for ordinary daily requirements, and is installed to take care of such additional freight locomotives, sweepers and ploughs as may be used from time to time.

The feeder cables are supported on malleable iron composition type of insulators carried on standard oak pins, which in turn are supported by 3¼ in. by 4¼ in. by 4 ft. pine cross arms attached to the poles with galvanized braces. On all curves the cross arms are double and iron pins are used instead of oak. Aluminum clamps are used at the ends of the cable and at curves to properly anchor the feeder cables.

At each end of every curve and at

half mile intervals the trolley and messenger wires are anchored to extra poles and suitably guyed. The trolley is sectionalized in front of the Chambly Basin sub station and midway between Chambly and St. Lambert sub stations, the section breakers being bridged by disconnecting switches attached to the feeder. During normal operation the two sub stations run parallel. The feeder is tapped at every tenth pole with Dossert aluminum and copper cable taps attached to 3/0 weatherproof wire which terminate in fed in ears attached to the trolley wire. Garton Daniels 625 volt lightning arresters are placed on every tenth pole and connected to the feeder taps. It is interesting to note in con-

nection with this overhead work that provision has been made in the fittings, insulators, etc., for the projected future change to high voltage special pantograph connectors and contact wire, which may be used in event of large extensions of the system.

three 185 kva. delta connected, oil insulated, self cooled transformers, high tension 24,000 volts, low tension 2,300 volts. Switches and resistance grids are furnished for starting purposes.

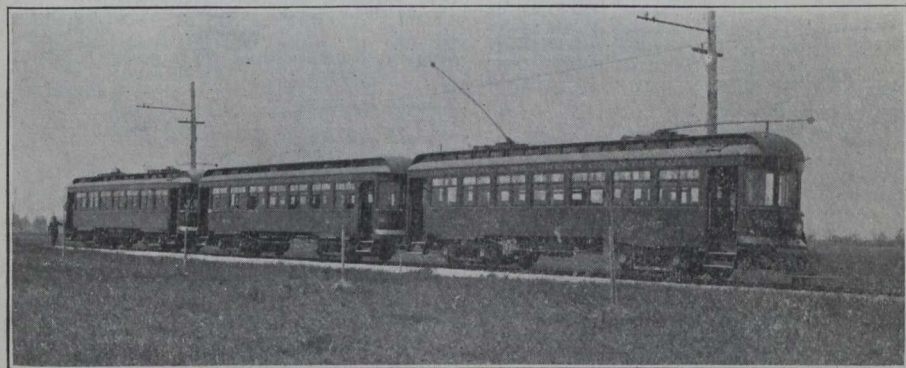
The a.c. and d.c. switchboards and the line apparatus, including Northern type A disconnecting switches and air cooled choke coils, both 100 amp. 25,000 volts, the 20-5 amp. Wagner o.w.g. 40, current transformers, the Westinghouse electrolytic lightning arresters, the 100 amp., 22,000 volts 3 phase s.t. conduit type circuit breakers, for cell mounting, etc., were supplied by the Northern Electric and Manufacturing Co. An interesting feature peculiar to the connection with duplicate high tension supply is an inter-

locking device on the oil switch connecting rods back of the a.c. switchboard, installed to prevent paralleling of the M.L.H. & P. Co.'s transmission lines.

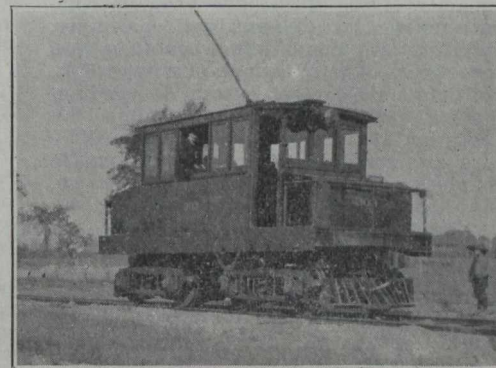
For the three rotary converters at St. Lambert there are three concrete foundations 6 3/4 ft. by 7 ft. 8 ins., and room for two more in the event of increased

similar connections for the positive and negative and equalizer generator leads to the d.c. switchboard. Positive feeder cables from switch on d.c. board to outside of building are 600,000 cm. r.c.d.b., two cables to each feeder panel.

TOOLS.—A 10 ton manually operated travelling crane is a part of the equip-



Multiple Unit Train.



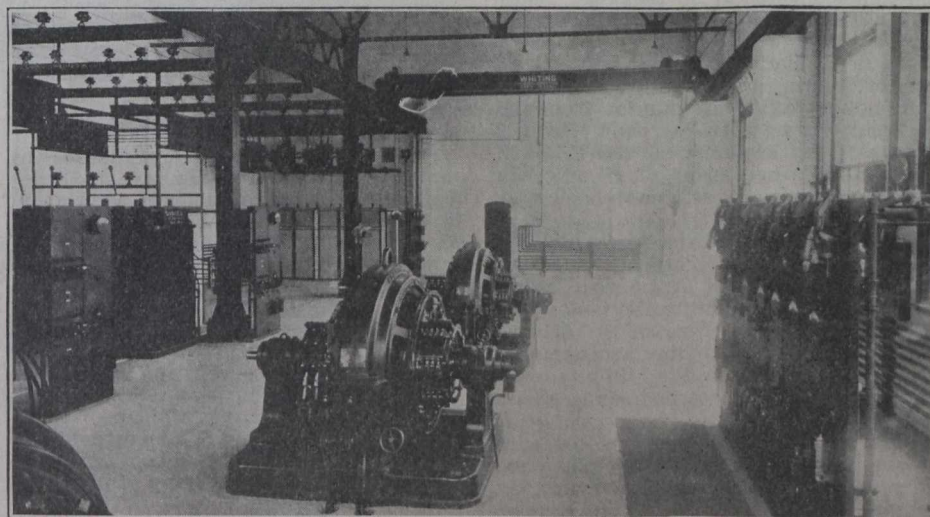
Combination Locomotive and Sweeper.

A COMPLETE TELEPHONE DISPATCHING System has been installed, consisting of the Northern Electric and Manufacturing Co.'s selector type of ringing equipment, with dispatcher operator located next to the Superintendent's office in the car barns at St. Lambert. The telephone line consists of no. 11 hard drawn copper wire, supported on pony glass insulators on side brackets, which are attached directly to the poles supporting the trolley. Telephone wires are transposed at intervals of three poles to overcome the induction from adjacent high tension lines.

POWER.—The layout of the sub stations has been determined largely by the variation in load on the M.L.H. & P. Co.'s plant at Richelieu. While the voltage supply may vary as much as 12% at Chambly and 4 1/2% at St. Lambert, pressure is maintained practically constant on the interurban system.

The interesting problem of power equipment in the sub stations to meet the conditions of line supply has been solved by the installation of a motor generator plant at Chambly and rotary converters at St. Lambert. In addition to the arrangements for present requirements, accommodation for future additions has been made in the walls, foundation space, switch compartments, wiring system, etc.

At Chambly a 6 ft. 4 in. by 13 ft. 2 in. concrete foundation supports the first motor generator unit, and provision is made for a second foundation to support a future additional set. A 600 h.p., 3 phase, 63 cycle, 2,300 volt, 10 pole, wire wound rotary Westinghouse induction motor is driven direct connected to a 400 kw., 600 volt, compound wound, direct current, interpole Westinghouse generator. Power is supplied to the set by



St. Lambert Sub Station.

demand. The use of rotary converters, with their greater efficiency, can be taken advantage of under the conditions obtaining at this point, by special arrangement with the M.H.L. & P. Co. requiring that its lines must not be seriously disturbed in starting up these units. Each converter is 500 kw. capacity, 6 phase, 600 volt d.c., 63 cycles, at 945 r.p.m., 8 pole, compound wound, self starting on the a.c. side from low voltage taps from transformers, and built by the Canadian Westinghouse Co., with shaft extensions to take starting induction motors eventually if needed.

Connected with each unit are three delta connected, 185 kw., 24,000/428 volt, 63 cycle, Westinghouse transformers, of

ment of the St. Lambert sub station. In the repair pits under the track in the new car barns a small hydraulic jack facilitates the removal of motors, etc., from below the cars. No extensive tool equipment is required, inasmuch as the G.T.R. shop facilities at Point St. Charles are available for heavy repairs. At the St. Lambert headquarters perforated steel sanitary lockers add to the road's modern equipment.

ROLLING STOCK.—The car equipment first put into service included 14 single end control 49 ft. 4 in. by 8 ft. 1 in. cars, with 56 seat standard interurban closed bodies, of 54,500 lbs. total weight, which weight was necessarily limited, as previously mentioned by the permissible

Montreal Tramways Company's Annual Meeting.

loading on the Victoria Jubilee Bridge. Their motor equipments of four Westinghouse 101 B2, 40 h.p., 600 volt, d.c. motors, geared 18/66, give satisfactory service. Trucks are standard Curtis type, placed 25 ft. 4 ins. centre to centre, 6 ft. wheel base, Westinghouse automatic air brakes, with individual compressors and the usual hand brakes are on each motor car.

Adhering to this type, and with equipments of 200 h.p. in Westinghouse 306, 50 h.p. at 500 volts d.c. interpole railway motors, an addition of eight cars has been made. The car bodies were built and equipment installed by the Ottawa Car Co., from specifications prepared under direction of the railway company. They have a maximum passenger seating capacity of 56. Two have baggage compartments, two are straight passenger, and four are combination smoking and passenger. The Westinghouse type H.L. multiple unit control system is used on the eight new motor cars to allow the operation of trains for heavy traffic. The cars are coupled together by automatic couplers. They are lighted by 30 c.p. lamps and Crouse Hinds luminous arc headlights are used. Tail lamps are standard, and an equipment of torpedoes and torches is carried on each motor car. The car heating system consists of Gold 115-E-1 heaters in two circuits of 6 and 12 each.

A 48,000 lb. 160 h.p. sweeper and locomotive, geared 15/69, and two rotary snow ploughs of the same power, geared 15/69, are extra equipment, and the possible purchase of other locomotives for freight handling will make this a very modern electric road.

OPERATION.—During reconstruction of the road its original service has not been interrupted. On its own tracks, cars and trains are operated by the Chief Dispatcher, located at St. Lambert. They have a headway of 20 and 40 minutes; those to Longueuil being scheduled to return in 1 hour, 20 minutes, allowing 28 minutes running time each way; the trip to Richelieu taking 50 minutes from the Montreal city terminal, a round trip in 2 hours. On the Richelieu service this will permit an average speed of 25 miles an hour, the maximum attainable being 38 miles on hour.

When on the Central Vermont Ry. tracks, the Richelieu cars are operated according to standard steam road rules, and the dispatch of the trains is done by telegraph from the office in St. Albans, Vt. The double dispatching arrangement satisfactorily permits the simultaneous operation of the electrical and steam road traffics.

At St. Lambert car barns motor cars are run in over the inspection pits once every day in regular service, when they are gone over by the inspectors of trucks, wheels, air, motors, and controllers. The Superintendent, the clerical force, and other employes make their headquarters here.

PERSONNEL.—The officers of the M. & S.C. Ry. Co. are:—W. Wainwright, President; W. B. Powell, Vice President and General Manager; J. Yates, Secretary; Frank Scott, Treasurer.

In bringing the road to its present stage of development, Bion J. Arnold has supplied his considerable facilities as consulting electrical engineer and traction expert, both in making the general and detailed plans and specifications, and in supervising the actual construction to date, the detail work being in charge of his principal assistant, F. A. Sager, and of A. T. Hunt as Resident Engineer in the field.

Following are extracts from the report presented at the annual meeting, Aug. 5:—

Your directors beg to submit their second annual report, accompanied by the financial statements, which show the following results for the year ended June 30.

Gross earnings	\$6,754,227.37
Operating expenses	4,932,664.57
Net earnings	\$2,721,562.80
From which deduct:—	
City percentage on earnings	\$489,079.88
Interest bonds and loans	721,151.76
Interest Debenture stock 800,000.00	
Taxes	73,000.00
Net income	\$2,083,231.64
Dividends	\$ 638,331.16
Surplus	\$ 481,949.16
Less:—	
Proportion of discount on bonds sold	\$ 63,714.20
Transferred to contingent account	200,000.00
Transferred to capital reserve	23,670.17
Transferred to general surplus	\$ 194,564.79

In view of this being the first complete year's operation of this company, the figures submitted cannot be compared with the figures of the last statement, which covered nine months only, but your directors are pleased to state that the increase in gross earnings and the ratio of operating expenses to earnings are satisfactory.

Your directors have appropriated from surplus \$200,000 for contingent account, this being in addition to \$300,000 appropriated from earnings for the same purpose, making a credit to this account during the year of \$500,000, which added to the amount carried forward last year of \$127,648.13, makes a total credit to this account of \$627,648.13, against which has been charged \$442,892.13, leaving a balance at the credit of this account of \$184,756.

During the year there has been expended on capital account \$976,008.07.

Following out the policy adopted by the company of insuring its properties against fire, a large sum has been spent in changes and additions to same which has resulted in a substantial reduction in premium rates, as well as improving the properties.

During the year the company issued \$2,890,000 of its 5% 30 year gold bonds at a satisfactory figure. From the sale of these bonds there remains at the credit of the company at the Harris Trust & Savings Bank, Chicago, \$1,637,954.75, which is at the disposal of the company for extensions and improvements. Your directors have issued 9,993 shares of common stock, which have been allotted to the shareholders at par. The bonds, debentures and common stock have been listed on the Montreal Stock Exchange. Application has also been made to have the bonds listed on the London and New York Stock Exchanges.

During the year an interim dividend of 5% was paid, and a dividend of 2½% was declared for the quarter ended June 30 last, payable on Aug. 1.

The following exclusive franchises have been granted to the company:—Parish of St. Laurent, 25 years; Town of Mount Royal, 25 years; Town of Pointe aux Trembles, 40 years; Town of Montreal East, 40 years.

The company has continued its liberal policy towards its employes in respect to wages, having increased them during the year.

The property has been maintained in a proper state of efficiency, and in addition to the large sum spent on maintenance and upkeep there has been expended on extraordinary renewals of track and rolling stock \$442,892.13.

Your directors have come to an understanding with the City of Montreal, which it is hoped will tend to relieve the congestion which has arisen by reason of the great growth of the city.

Expenses per cent. of earnings	59.71
Passengers carried	159,892,021
Car earnings per passenger	4.09c
Transfers	53,505,304
Total passengers carried	213,397,325
Car earnings per passenger total carried	3.06c

ASSETS	
Cost of road and equipment. \$32,913,808.61	
New construction	976,008.07
Accounts receivable	312,814.27
Stores	484,733.59
Discount on bonds	81,670.00
Cash in bank and on hand	\$ 586,404.88
Cash on Deposit Harris Trust and Savings Bank	1,637,954.75
Cash Underlying Securities Redemption Fund	622,328.03
Investments	\$2,846,687.66
	\$3,725,925.52
	895,000.00
	\$88,010,742.20

LIABILITIES	
Capital stock (common subscribed)	\$3,000,000.00
Less unpaid and subject to call	818,790.00
Debtenture stock	x\$ 2,181,210.00
First and refunding Mortgage 5% gold bonds	x 16,000,000.00
Underlying bonds	13,335,000.00
Less redeemed and cancelled	\$4,420,000.00
	524,713.32
	3,895,286.68
Mortgages	36,863.00
	\$85,448,359.68
Accounts and wages payable	366,632.24
Accrued interest	236,759.95
Accrued tax on earnings	371,070.47
Employees' Securities	23,985.28
Unclaimed dividends	1,956.57
Unredeemed tickets	139,740.96
Suspense Account	179,153.18
Dividend payable Aug. 1st	56,697.00
	1,375,995.65
Capital Reserve	600,000.00
Contingent account	184,756.00
Surplus	401,630.87
	1,186,386.87
	\$88,010,742.20

It was decided to increase the board from 7 to 9. The retiring directors were all re-elected and W. G. Ross, formerly managing director Montreal St. Ry. Co., and P. J. McIntosh, of New York, were added to the board. The directorate for the current year is as follows:—President, E. A. Robert; 1st Vice President, J. W. McConnell; 2nd Vice President, F. H. Wilson; other directors, W. C. Finley, G. C. Foster, P. J. McIntosh, J. M. McIntyre, W. G. Ross, Hon. J. M. Wilton. The following officers were re-elected:—Secretary-Treasurer, Patrick Dubee; Assistant Secretary, A. E. Shaw; General Manager, J. E. Hutcheson.

London St. Ry. Gross earnings for July, \$29,965.54; expenses \$20,749.39; net earnings \$8,946.15; deductions \$2,450; net income \$6,496.15, against \$28,205.35 gross earnings; \$18,711.63 expenses; \$9,493.72 net earnings; \$2,450 deductions; \$7,043.72 net income for July, 1912.

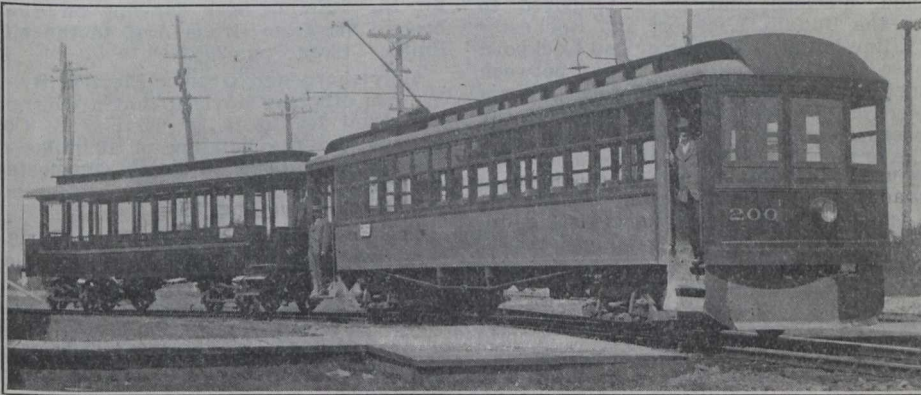
Regina Municipal Ry. Revenue for four weeks ended July 26, \$18,609.35. Passengers carried, 449,728.

The Toronto civic street railway service on St. Clair Ave., from Yonge St. to West Toronto, was put into service Aug. 25. A 2c. fare is being charged, and six tickets are being sold for 10c.

Edmonton Interurban Railway Construction, Etc.

Construction on this line, which was commenced last autumn, was again taken up last spring. We were officially advised recently that the initial seven miles from the outskirts of Edmonton, to St. Albert, Alta., had been graded and track laying started, that material for 10 miles was on the ground, and that the construction of the three miles intervening between the Edmonton Radial Railway and the Company's line would be completed by the end of August.

We are officially advised that it is not the Company's intention to operate its cars, at present, by electric power. Traffic conditions ruling at present, and for the immediate future point to the development of the system by means of individual power units rather than by the establishment of a central power station, which would involve a tying up of capital that could be more advantageously applied to the construction of mileage. It has therefore been decided to use cars operated by internal combustion motors, and after a very thorough and exhaus-



Two Car Train, Hull Electric Co.

tive examination of various types, made by the Chief Engineer and the directorate, both on this continent and in Europe, a type of car manufactured in England has been selected. The most outstanding feature of this car lies in the transmission, in which all gearing is dispensed with. The power of the engine is transmitted, through the medium of a pump connected therewith, by a column of oil under pressure, to oil motors attached to the axles of the driving truck. This forms a very elastic transmission, and is claimed to suffer from none of the defects which are necessarily attached to the old form of gear transmission. The control is directly from the engine, and it is claimed that the car may undergo the most violent changes in speed and direction and may be brought to a dead stop without the use of brakes, without subjecting any part of the mechanism to undue strain. These cars have undergone very exhaustive tests, not only at the hands of the English manufacturers, but also in cars in use in various parts of the world. The cars ordered by the Edmonton Interurban Ry. Co., however, are as yet the largest built to be equipped with this transmission, and it is stated that should the initial test be satisfactory, cars of similar pattern will be used by the Australian Government on the new transcontinental line now being built across the Australian continent, the operation of which by steam power over the arid regions of the interior would be attended with great difficulty.

Negotiations are in progress with the City of Edmonton for running rights over the municipal railway, so that the company cars may run right into the heart of the city.

Two Car Trains on Hull Electric Company's Railway.

The illustration on this page shows a Hull Electric Co.'s two car train on a curve of 40 ft. radius. These trains are used to handle traffic during rush hours, and during race week they proved very efficient and economical between Ottawa and Connaught Park Jockey Club.

The cars are fitted with Westinghouse S. M. E. air brakes and automatic car and air couplers. The trailer has a combined entrance and exit at the front end and there are no steps on the rear of the trailer. Both cars are operated P. A. Y. E. with one conductor on the rear of the motor car and one conductor in charge of the trailer.

We are indebted to G. Gordon Gale, M.Sc., A.M. Can. Soc. C.E., General Superintendent, for the photograph and information.

Electric Railway Finance, Meetings, Etc.

British Columbia Electric Ry.—Gross earnings for June, \$543,186; operating expenses, \$354,049; net operating earnings, \$189,137; renewal funds, \$51,620; net earnings, \$137,517; approximate income from investments, \$35,000; net income, \$172,517, against \$498,306 gross earnings; \$317,840, operating expenses, \$180,466 net operating earnings; \$37,935 renewal funds; \$142,531, net earnings; \$25,000 approximate income from investments; \$167,531 net income for June, 1912. Aggregate gross earnings for 12 months ended June 30, \$6,812,309; net earnings \$2,289,797, against \$5,749,649 aggregate gross earnings, and \$2,004,361 net earnings for same period 1911-12.

Cape Breton Electric Co.—Gross earnings for June, \$30,644.70; operating expenses and taxes, \$17,913.18; net operating earnings, \$12,731.52; interest charges, \$4,891.66; balance, \$7,839.86; bond sinking and improvement funds, \$1,190; net balance, \$6,649.86; against \$29,448.22 gross earnings; \$16,791.57 operating expenses and taxes; \$12,656.65 net operating earnings; \$4,495.84 interest charges; \$8,160.81 balance; \$1,206.67 bond sinking and improvement funds; \$6,954.14 net balance for June, 1912. Aggregate gross earnings for 12 months ended June 30, \$373,788.11; operating expenses and taxes \$200,742.94; net operating earnings \$173,045.17; interest charges \$55,931.11; balance \$117,114.06; bond sink-

ing and improvement funds \$14,380; net balance \$102,734.06, against \$346,437.67 aggregate gross earnings; \$191,444.64 operating expenses and taxes; \$154,993.03 net operating earnings; \$54,050 interest charges; \$100,943.03 balance; \$13,880 bond sinking and improvement funds; \$87,063.03 net balance for same period 1911-12. Construction charges for June, \$4,364.83, and for 12 months ended June 30, \$42,274.38.

Grand Valley Ry.—An order was made Aug. 7, for the issue of a distress warrant against the Company's property for \$7,555.62, arrears of taxes. The warrant is not to be issued until Sept. 17. The Company is in the hands of E. B. Stockdale, Toronto, as receiver, and an action by the City of Brantford for the forfeiture of the franchise in the city is pending. The receiver has no funds out of which to pay the taxes, and it is claimed that he cannot raise them because of the action.

Moose Jaw Electric Ry.—Some extracts from this company's annual reports for 1912 were given in Canadian Railway and Marine World for July, pg. 342. The following particulars have been received since:—Gross revenue, ticket sales, cash fares, special cars, advertising, lighting, etc., \$77,996.85; gross cost of management, operation and maintenance, \$65,925.92, showing a surplus of revenue over expenditure of \$12,070.93.

Quebec Ry., Light, Heat and Power Co.—Sir Rodolphe Forget, President, is reported to have stated recently, that the bond interest had all been paid, that the company is in a good position, that its earnings are sufficient to cover the whole of the operating expenses and other charges, and that it is anticipated that in the course of a year or two, with careful management, the present difficulties will have been cleared up.

See Quebec and Saguenay Ry under "Railway Finance Meetings, etc."

The St. John (N. B.) Ry. Co. is issuing \$200,000 new stock at par. The proceeds are to be used in connection with the extensions and improvements now in progress.

Toronto Ry., Toronto and York Radial Ry., and allied companies.—Gross earnings for June, \$815,206; operating expenses, maintenance, etc., \$405,337; net earnings, \$409,869, against \$696,980 gross earnings; \$357,365 operating expenses, maintenance, etc.; \$339,615 net earnings, for June, 1912. Aggregate gross earnings for six months ended June 30, \$4,655,486; net earnings, \$2,249,422, against \$4,012,719 aggregate gross earnings; \$2,036,072 net earnings for same period, 1912.

The Toronto Ry. receipts for July were \$500,021.45, against \$445,896.44 for July, 1912. The percentage paid to the city for July was \$100,004.29, against \$89,279.29 for July, 1912.

Windsor, Essex and Lake Shore Rapid Ry.—The shareholders will be asked, in addition to the regular business to be done at the annual meeting to be held in Windsor, Ont., Sept. 3, to ratify a bylaw, resolution and agreement made Dec. 17, 1909, with the Union Bank, and for the issue of the balance of the bonds, amounting to \$250,000, now in the treasury, in accordance with the terms of such bylaw, etc.

Winnipeg Electric Ry.—Gross earnings for June, \$321,037; operating expenses, \$173,270; net earnings, \$147,767; against \$300,402 gross earnings, \$150,090 operat-

ing expenses, \$150,312 net earnings for June, 1912. Aggregate gross earnings for six months ended June 30, \$1,972,374; net earnings, \$876,989; against \$1,808,703 aggregate gross earnings, \$841,129 net earnings for same period, 1912.

Electric Railway Notes.

The Edmonton Radial Ry. has received six city cars, part of order for 35, from the Preston Car and Coach Co.

The Dominion Power and Transmission Co. has received two suburban cars from the Preston Car and Coach Co.

The Regina Municipal Ry. has received two single truck city cars, completing an order of six, from the Preston Car and Coach Co.

The Board of Railway Commissioners has approved of the Hull Electric Co.'s bylaw covering rules and regulations for the governing of its employes.

In connection with the operation of electric railways throughout the Dominion, there were no fatal accidents during June, but there were 11 non fatal ones.

The Hudson Bay Co. hired the 65 cars of the Calgary Municipal Ry. for four hours on Aug. 18, and carried passengers free during that time in connection with the opening of its new store in the city.

The Montreal City Council is being asked to pass a resolution for the annulment of the franchise granted to the Canadian Autobus Co., on the ground that it has broken its agreement in not beginning its service in June.

The Montreal Tramways Co. has entered a test case in order that the courts may determine how far a conductor may go in endeavoring to enforce compliance on the part of passengers with the regulations enacted by the company to maintain good order on the cars.

Following the voting in favor of the operating of cars on Sundays in the municipalities of St. Andrews and Selkirk, an agreement has been reached between the municipalities and the Winnipeg, Selkirk and Lake Winnipeg Ry., with the approval of the Public Utilities Commissioner for Manitoba, that the Sunday service shall consist of seven cars each way. Ordinary fares will be charged, and excursion fares will be granted as circumstances call for. The agreement is for five years.

The Imperial Privy Council recently gave judgment in the appeal from the decision of the Canadian courts, in what is known as the Point Grey, B.C., electric railway franchise case. The municipal council of Point Grey passed a resolution granting the British Columbia Electric Ry. permission to construct an electric railway, without obtaining the formal assent of the ratepayers. Certain ratepayers objected and obtained an injunction preventing the company operating cars on the lines which had been built in Point Grey. The ratepayers voted in favor of the franchise Sept., 1912, and the Privy Council now declared that the original action of the council was valid.

Judgment has been given in London, Eng., in favor of the Toronto Ry., and the Toronto and York Radial Ry., in an action against the National British and Irish Millers Insurance Co., for the recovery of a percentage alleged to be due from the insurance company as underwriters of fire insurance on sheds and contents of the railway companies, and which were damaged by fire, Mar. 25, 1912. Other underwriters concerned

agreed to the amount fixed by the adjuster, but the defendant company claimed that the adjustment was not legally binding, and was on a wrong basis. The judgment held that the plaintiffs were en-

titled to a finding, but that the adjustment was not legally binding, and the amount to be paid would be ascertained hereafter. The question of costs was reserved.

Electric Railway Projects, Construction, Betterments, Etc.

British Columbia Electric Ry.—The laying of a second track on the line along the Westminster Road in South Vancouver has been practically completed.

An extension of the line in the Queensboro section of New Westminster is to be built at once along Canal St., 2,200 ft., to a junction with the Canadian Northern Pacific Ry. tracks at Ewen Ave. (Aug., pg. 344.)

Buffalo, Lockport and Rochester Ry.—Application has been made to the Public Service Commission of New York State for permission to reorganize this company, and to amalgamate with other lines, for the purpose of giving a through service by means of an electric railway, between Rochester, N.Y., and Toronto. The plans, so far as they have been outlined, disclose that it is proposed to use the Buffalo, Lockport and Rochester Ry. line between Rochester and Lockport, lease the International line between Lockport and North Tonawanda, and run over the proposed frontier lines of the International line to Niagara Falls, N.Y. The proposed Trans-Niagara bridge would be used to obtain an entrance into Canada, where connection would be made with the electric lines existing or projected, owned by the Mackenzie, Mann and Co.'s interests. This is the revival of the plans proposed some years ago, but at present nothing definite is known, but that the New York State Public Utilities Commission has before it the application referred to.

Burrard, Westminster Boundary Ry. and Navigation Co.—In connection with the proposal to build an electric railway from Mission to Vancouver, B.C., one of the questions discussed was the construction, with government aid, of a bridge across the Pitt River, near Coquitlam. It was announced on behalf of the British Columbia Government, July 28, that tenders were to be immediately asked for the building of the necessary piers and abutments for this bridge, and that the Government had bought from the C.P.R. the superstructure of the present bridge across the Pitt River at Coquitlam. This bridge is being replaced by a new double track one, and the B.C. Minister of Public Works said, "We have awarded a contract to Armstrong and Morrison to move the sections of the old bridge away as fast as the C.P.R. is through with them. They will be placed on pile supports nearby to remain until the substructure for the new bridge is ready." The new bridge will provide for general traffic and the proposed electric railway. (July, pg. 344.)

Calgary Municipal Ry.—The Calgary City Council has approved of a project for the building of an extension of the line through Shaganappi Park. The promoters of the extension agree to pay \$20,000 for construction, and guarantee the expenses of operation for four years, at the end of which time the city is to pay back the cost of construction. The signing of the agreement is being held up, pending a decision on the question of whether the agreement has to be ratified by the ratepayers or not. (May, pg. 235.)

Edmonton, Stony Plain and Wabamun Ry.—We are officially advised that this projected railway will run from Edmonton West to Stony Plain, and on to Lake Wabamun, 45 miles. It is hoped to build several miles of line this year. The right of way has been secured and cleared for a good distance out of Edmonton. The officers and directors have not yet been chosen. E. S. McQuoid, Edmonton, is solicitor for the provisional directors. (Aug., pg. 395.)

Forest Hill Electric Ry.—The York (Ont.) Township Council, Aug. 8, granted a franchise for this proposed electric railway within the township. It is stated that construction will be started at once. (Aug., pg. 395.)

Montreal Tramways Co.—The Westmount City Council has given permission for the building of a car line on Sherbrooke St., from Green Ave. to the city limits. (Aug., pg. 395.)

Morrisburg and Ottawa Electric Ry.—We are officially advised that a contract has been let to R. J. Tierney & Co., Ottawa, for the building of 10 miles of line from Ottawa to South Gloucester, Ont. L. Von Sydow, Ottawa, is Engineer in Charge. (Aug., pg. 395.)

Nipissing Central Ry.—The Ville Marie, Que., Chamber of Commerce, has passed a resolution in favor of the extension of the line to Fort Timiskaming and Ville Marie, and proposes to send a deputation to the Timiskaming and Northern Ontario Ry. Commission to urge its construction.

A start was made, Aug. 7, with the construction of the new car barns at North Cobalt. The contract has been let to Sutcliffe and Neelands, Liskeard, Ont., who expect to have the work completed by the end of the year. (Aug., pg. 395.)

Ontario Hydro-Electric Power Commission.—F. A. Gaby, Chief Engineer, recently stated that the preliminary work on the survey for the projected electric railway from Toronto to Port Perry, Ont., had been completed, and that a report was being prepared for submission to the Commission. A route with satisfactory gradients is said to have been secured. (Aug., pg. 395.)

Port Arthur and Fort William Electric Ry.—The city of Fort William, Ont., is advertising for tenders for erecting an addition to the Walsh St. car barns, and the addition will be of brick, 260 ft. long and 30 ft. high. (April, pg. 185.)

Quebec Ry., Light and Power Co.—H. G. Matthews, General Manager, is reported to have stated Aug. 12, that it was expected to have the Limoilou extension in operation over the Dorwin Bridge, as far as 4th Avenue, Limoilou by Aug. 30. (June, pg. 287.)

Regina Municipal Ry.—Superintendent Doughty is reported to have stated, Aug. 8, that construction for the year was well advanced, but was being held back somewhat to enable the other city departments to catch up with the work on sewers and waterwork mains. An expenditure of about \$200,000 has been made on these extensions this year, and they will be brought into operation as fast as possible. The city is expanding

rapidly, and it is the policy of the council to provide transportation facilities as long as the expansion continues. It was reported that the city was losing \$200 a day on the railway. As a matter of fact the deficit in July was \$1,423.91. (Aug., pg. 395.)

St. John Suburban Ry.—Surveys have been made for a line from St. John to Loch Lomond, 14 miles, and for a portion of the line from St. John to Rothesay. It is proposed in addition to run a line from St. John to Westfield and Millidgeville, N.B. (June, pg. 287.)

Stratford Ry.—C. T. McAllister, Toronto, and A. E. Beer, Montreal, have been in Stratford negotiating with the directors of the company and the city council respecting the building of an electric railway. In the conference it was stated that the interests represented desired to build an electric railway from London to Grand Bend, via Parkhill, and one from Stratford to Grand Bend, via Exeter, and had also under consideration the possibility of building a line from Stratford to Wellesley and Linwood. In connection with these plans it was proposed to acquire the charter of the Stratford Ry., which has been abandoned by the Mackenzie Mann & Co. interests. It was stated that those interested in the matter have acquired a charter covering the lines to Grand Bend, at which point a site of 100 acres has been acquired for park purposes. A committee was appointed to negotiate with the promoters as to any projected line in Stratford.

C. T. McAllister was in Stratford Aug. 7, in connection with the proposed railway. He said it was a little early to say anything about the suggested line north. The lines from London to Grand Bend, and Stratford to Grand Bend were absolutely assured. Arrangements had been made for the purchase of the necessary right of way. The London-Grand Bend line, for which the company had acquired a charter would be built first. Application would be made to the Ontario Legislature next session for a charter for the Stratford-Grand Bend line. Local reports state that the promoters of the new line are negotiating for the purchase of the charter rights, right of way, etc., of the People's Ry., between Stratford and Guelph. Some little grading was done between these points about three years ago. (Aug., pg. 395.)

Toronto Suburban Ry.—The construction of this railway is being held up near Islington owing to some difficulties as to street crossings, to which the Etobicoke Township Council object. A compromise is being arranged. Grading is practically completed for the greater part of the distance into Guelph, and considerable material for tracklaying has been delivered on the right of way from Cooksville westerly, but at the time of writing no track had been laid. (Aug., pg. 395.)

The Vancouver Hydro-Electric and Tramway Co., which was incorporated under the British Columbia General Act respecting electric railways, Nov. 12, 1912, is reported as proposing to construct an electric railway between Ladysmith and Nanoose Bay, with branches and extensions. The two points named are 50 miles apart, and it is said that the necessary surveys have been made, and that the Minister of Railways for the Province has approved of the route. Application is said to have been recently made to use a trackless system of electric motor trams, but no decision has been given. M. Yates, Victoria, B.C., is the principal promoter. (July, pg. 345.)

Winnipeg Electric Ry.—The extension of the Park line along the Pembina highway has been practically completed as far as the new University buildings, three miles, and is to be extended still further to St. Norbert. (Aug., pg. 395.)

Telegraph, Telephone and Cable Matters.

The Canadian Northern Telegraph Co. has opened offices at Moose Jaw and Beadle, Sask.

W. J. Camp, Assistant Manager, C.P.R. Telegraph, Montreal, is on a tour of inspection over the system in the west.

An agreement between the British Government and the Marconi Wireless Telegraph Co., for the erection of a number of wireless telegraph stations on British territory throughout the world, has been ratified by the British Parliament.

The Colonial Secretary announced recently in the British House of Commons, that by a new subsidy arrangement, the rates by the West Indies cable had been reduced by about 50%. An additional subsidy is now being paid, of £16,000 a year, divided between the British and Canadian Governments.

The Western Union Telegraph Co.'s cable to Bay Roberts, Nfld., has been laid, and the building of the company's new offices at that point is proceeding rapidly. The laying of the Colinet cable is also proceeding. It will be laid in a specially dug trench, and through intersecting lakes to Shearstown, about 25 miles.

A. B. Smith, Manager, G. T. Pacific Telegraph Co., who returned to Winnipeg recently, after an inspection trip over the western lines, stated that telegraphic service would shortly be extended to McBride, B.C., and that commercial service to Moose Jaw, Calgary and other important points would also soon be available.

The C.P.R. Telegraph Department at Toronto has moved into the new C.P.R. building, King and Yonge Sts., from its old offices in the Board of Trade Bldg. The operating room in the new building was completely equipped with the most modern appliances, so that in the moving of the operators no delay whatever occurred in the telegraph service.

J. T. Phelan, Superintendent of Telegraphs in Northern British Columbia and Yukon for the Dominion Government, on his return to Vancouver from the north recently, stated that the Government is building a composite telegraph and telephone line from Queen Charlotte to Masset and Tohill, and connecting Queens-town, about 85 miles. The whole of the line is land wire, except a short stretch of cable at Alford Bay.

The Great North Western Telegraph Co. has completed the installation of a motor generator plant at the Michigan Central Rd. station offices at St. Thomas, Ont., replacing the gravity battery with which the work has been done in the past. The plant consists of five motor generator sets, supplied by the Canadian General Electric Co., each motor of 110 volts, three phase, 25 cycle, and the generators of three units of 240 volts d.c., compound wound and two units 25 volts d.c., compound wound. The telegraph office is also equipped with two sets of Athearn standard quadruplex, two bridge duplex and single line repeaters. The plant is under the supervision of C. E. Davies, the company's Supervisor of Equipment, and the M.C.R. interests are looked after by J. J. Ross,

Superintendent of Telegraphs, and C. O. Vandervoort, Telephone Engineer.

Grounding of the s.s. Lake Manitoba.

Following is a judgment of the Dominion Wreck Commissioner, Commander H. St. G. Lindsay, concurred in by Capt. F. Nash and John Mitchell, as nautical assessors, in the grounding of the C. P. R. s. s. Lake Manitoba, on the Isle of Orleans, July 28:

The s.s. Lake Manitoba, belonging to the C.P.R. and engaged in regular trade between Canada and Liverpool, Eng., appears to well found and equipped in every respect, and was navigated in a proper and seamanlike manner up to July 28, when she left Father Point, after having taken on the company's regular pilot, A. Lachance, and proceeded towards Quebec. From this time up to the stranding she was navigated by courses, given under the direction of the pilot, from point to point, and a mean of these courses entered in the ship's log. According to the evidence, St. Jean light was passed abeam on July 29, at a little less than ¼ mile, and a course was then set to pass to the southward of St. Laurent light, which was in sight. Shortly after passing St. Jean, the St. Laurent light became obscured by fog, and orders were then given to put the engine room telegraph at stand by, and immediately after, to half speed. The master being off the bridge, he was at once notified by the junior officer on watch as to the change in weather conditions, and arrived on the bridge just as the return signal for half speed was made from the engine room. It appears that at this time the pilot who was on top of the wheel house, beside the standard compass, saw a bright light about a point on the port bow, and for some unknown reason gave orders to the man at the wheel to port, and a second order to port more was afterwards given, which orders were carried out and the helm put about three parts over, the vessel's head swinging to the northward. The master on coming up to where the pilot was, noticed that the vessel was off her course, by the position of the land, and on asking the pilot the reason for this, was informed that he had ported for a steamer. The man at the wheel was immediately ordered to starboard, but before this order was effective the vessel took ground. She came off stern first under her own steam shortly after, and it was found on docking the vessel at Montreal, that she was very badly damaged.

The court unanimously unites in its opinion that the cause of the casualty was entirely due to the negligence of Ad-jutor Lachance, the pilot, inasmuch as he totally disregarded the rule of the road in porting for a bright light on his port bow, and also in not being aware of the exact position of his vessel with regard to the land. Moreover circumstances ultimately proved that there was not sufficient room for the execution of this manoeuvre. It is also of the opinion that had the pilot on seeing the bright light, at once stopped the engines and reversed, if necessary, the casualty would have been avoided. The court therefore suspends his license until the completion of the present season of navigation.

The pilot, A. Lachance, is President of the Corporation of Pilots of Quebec, and was one of the commissioners appointed by the Dominion Government, in the recent enquiry into pilotage matters on the St. Lawrence.

Marine Department.

Car Ferry Steamship for Prince Edward Island Service.

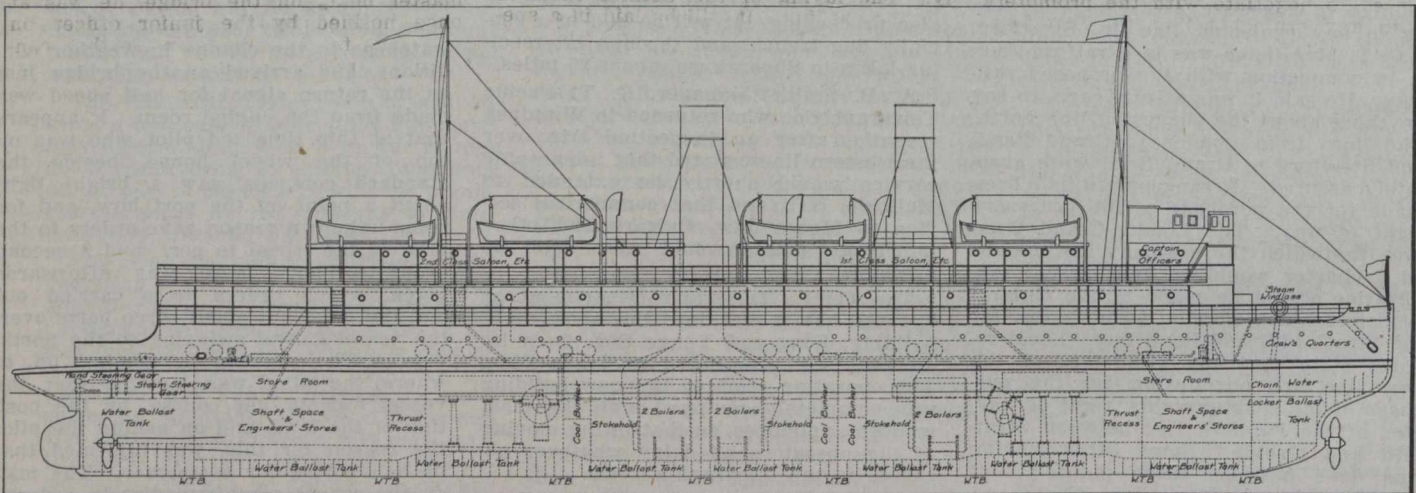
The project initiated by the Dominion Government for the improvement of the connection between Prince Edward Island and the mainland in New Brunswick is rapidly taking shape. At present, during the summer months, an efficient connection is maintained by a regular steamship service between Pointe du Chene, N.B., and Summerside, P.E.I., and between Pictou, N.S., and Charlottetown, P.E.I., operated by the Charlottetown Steam Navigation Co. In winter the service is maintained by the Dominion Government by an icebreaking steamship from Pictou, N.S., and when this fails small boats are resorted to between Cape Tormentine and Cape Traverse, being rowed through the open water and hauled over the ice. For a number of years the P.E.I. people have been asking the Dominion Government to provide better facilities. The question of constructing a tunnel under Northumberland Strait, so as to give a physical connection between the P. E. I. Ry. and the Intercolonial Ry., has been considered, but it has not seriously

strong, Whitworth & Co., Newcastle-on-Tyne, Eng., for a vessel to cost £138,000.

The new vessel will be an extremely interesting one and will differ to some extent from anything of her class that has yet been produced. She is designed in accordance with the experience gained by the firm in building a number of icebreaking steamers now in use in the Baltic Sea and on Lake Baikal, on the Trans-Siberian Ry., and will approach to some extent the Russian icebreaker Ermack, although she will not be such a powerful vessel. The governing principle in designing such vessels is to provide as far as possible against the nip of two approaching ice floes, a principle which was exemplified in the construction of the Fram, in which the Norwegian explorer, Nansen, drifted across the higher latitudes of the Arctic Ocean, and this principle has been adopted as far as possible within the limits of the present design. The ice conditions which this car ferry will be called upon to cope with are severe, although not of the same order of magnitude as those which

smoking room, pantry and stateroom for the stewardess, while the aft deckhouse will contain similar accommodation for the second class passengers. Above this will be the boat deck, fitted with davits for eight lifeboats, the wheelhouse being forward. The passengers will alight from the cars and pass to the promenade deck by means of stairways on both sides of the vessel. These stairways will lead to the entrance halls of the saloon deckhouses, from which large doors will give access to the several apartments. In the pantries will be lifts going down to the main deck, where the galley will be situated.

The car ferry will be fitted with three sets of propelling machinery, two sets being placed aft and one forward, the total in h.p. being 7,000. Each set of engines will be self contained and may be worked independently of the others, but any failure in the supply of circulating water has been guarded against, not only by special arrangements in the structure of the ship itself, but as a further means by connecting all the circulating pumps,



Prince Edward Island Car Ferry.

commended itself to the Government. The second proposition made, and to which consideration has been given on several occasions during the past ten years, was the establishment of a regular car ferry service, either with or without the alteration of the P. E. I. Ry. from narrow to standard gauge. Although the matter was discussed in Parliament and a company incorporated for the operation of a car ferry service, nothing came of it for some time. It was again brought up in Parliament in the session of 1911-12, with the result that it was decided to give serious consideration to the project. The Government engaged Professor A. K. Kirkpatrick, Queen's University, Kingston, Ont., to report on a route for a car ferry. The result of his investigations was embodied in a report which was published in Canadian Railway and Marine World of Oct., 1912. Following upon this, the Government adopted the Cape Tormentine-Carleton Point route, and began to prepare to carry out the necessary work. This involved the building of a car ferry suitable for the route, and a contract was let to Sir W. G. Arm-

have been successfully overcome in the Baltic Sea.

The new vessel will be 305 ft. over all, with a breadth of 53 ft. 10 in., and a draught of 18 ft. On this draught she will carry her full complement of 10 freight cars or six passenger cars, about 150 tons of coal, fresh water, stores and other requisites. The hull will be divided into nine compartments by eight watertight bulkheads, and filled with water ballast tanks in the cellular double bottom. The car tracks will be placed on the main deck, above which will be three decks—promenade, upper promenade and boat deck. The engineers and crew will be located on the main deck, the former aft and the latter forward. Stores, etc., will be located on other part of the same deck. The promenade deck will be immediately above the main deck and will extend round the space occupied by the cars. Over this will be the upper promenade and saloon deck. The forward house on this deck will contain staterooms for the captain, chief and second officers and contain the first class saloon, with seats for 38 passengers, ladies' room, and

so that to every condenser there will be two sources of supply. There will be six single ended boilers arranged two and two, each set of boilers being in a separate watertight compartment, in which will be contained not only the boilers and their accessories, but the necessary supply of coal. To provide accommodation on the main deck for the cars, the smoke stacks, of which there will be four, will be divided and brought out to the sides. The arrangements for coaling the vessel will be extremely simple. The hatches leading down to the bunkers will be arranged on the main deck, so that special coal cars can be brought over them and their contents discharged through hopper bottoms direct into them. The vessel will have two masts and will have wireless telegraphy installed.

A feature of the vessel which will be a new one on icebreaking steamships in Canada will be the forward screw. This feature was first introduced into the design of the Ermack. With it she was able to plough through 20 ft. or more of packed ice, enabling vessels to follow an open channel to the sea. When the ice

becomes too thick and dense to cut through it directly, the heavy bow is formed to ride upwards on to the ice surface, and the layer becomes broken up through the sheer superimposed weight of the vessel and the propelling effort exerted. The results of the experience gained in the operation of the Ermack and other similar vessels have been incorporated in this new vessel, which will therefore combine all that is modern and of proved excellence in the way of design and fittings for her special work.

The contract for the pier at Cape Tormentine has been let to A. P. Mackie, and new tenders are under consideration for the pier at Carlton Point, the Halifax Dredging Co. having withdrawn the tender originally accepted for this work. Parliament has voted \$1,000,000 on account of the work, which is to include the alteration of the gauge of the P.E.I. Ry. from narrow to standard. No decision

that the master is entirely to blame for the casualty, but having no jurisdiction over his certificate, it recommends that a copy of the evidence and judgment be forwarded to the German Government.

Collision of the Steamboat Mikado With a Motor Launch.

An enquiry into the cause of a collision between the Acadia Sugar Refining Co.'s steamboat Mikado and a motor launch in Halifax harbor, June 7, in which one of the occupants of the launch was drowned, was held at Halifax, N.S., recently, by the Dominion Wreck Commissioner, Commander H. St. G. Lindsay, assisted by Capt. Neil Hall and J. H. Harrison, as nautical assessors. Following is the judgment:—

The court is of opinion that the casualty was caused by the person in charge

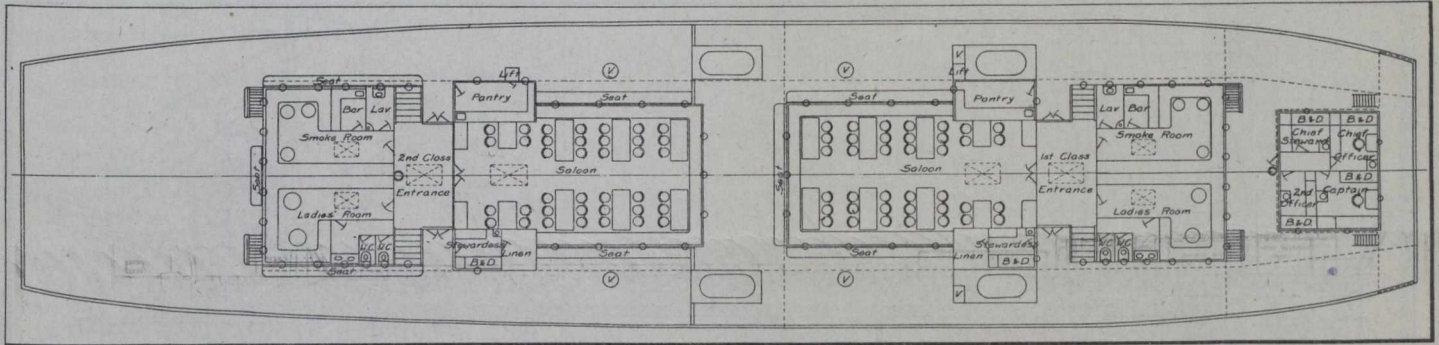
account for insurance and repairs. Dividends of 5% were paid on preference shares and of 10% on ordinary shares, and £131,020 was carried forward to credit of the current year's account.

The report states that the new cargo and passenger steamship Digby has been placed on the Liverpool and Halifax, N.S., service and is proving very successful.

Among the Company's investments shown is £100,000 of debentures in the British Maritime Trust Co., which has been heard a good deal of in Canada recently in connection with the Richelieu and Ontario Navigation Co. merger.

New Welland Ship Canal Construction.

Tenders for section 3 of the new Welland Ship Canal were received by the Department of Railways and Canals up to Aug. 27. This section is the portion

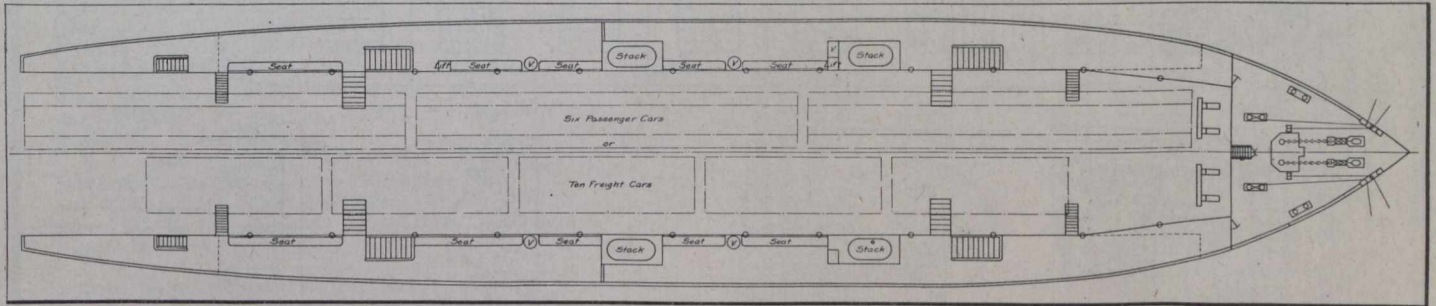


Prince Edward Island Car Ferry, Promenade Deck.

has been announced as to when this part of the work will be done, but it is expected to have the car ferry in operation by the winter of 1914. This will enable freight cars to be landed in P.E.I. and reloaded with freight, thus saving at least two handlings.

of the motor launch in not paying attention as to which direction his boat was going after she left the breakwater, he being engaged in attending to his engine, until his attention was called to the fact that the Mikado was close alongside, when he appears to have put his

of the canal through Thorold, and is about 2 miles long. While shorter than section 1, tenders for which were recently invited, as mentioned in the descriptive article of the canal in Canadian Railway and Marine World for July, it is possibly the heaviest portion



Prince Edward Island Car Ferry, Main Deck.

Stranding of the s.s. Maia.

The Dominion Wreck Commissioner, Commander H. St. G. Lindsay, assisted by Capt. Neil Hall and J. H. Harrison, as nautical assessors, held an enquiry recently into the causes of the stranding of the German s.s. Maia, on Seal Island, in the Bay of Fundy, while en route from Magdalen Islands to Manchester, Eng., June 7. Following is the judgment:—

The court is of opinion that the casualty was due to the fact that the master made no allowance for the set of the ebb tide when setting his course on the morning of June 7, as he must have had at least two hours of strong ebb setting him to the southeast before the stranding, and that had the lead been used before the alteration of the course was made the stranding might have been avoided. It is therefore unanimous in its opinion

helm the opposite way to that which he intended, and so ran his boat under the bows of the Mikado. The court, therefore, exonerates the master of the Mikado from all blame, as he appears to have done everything he could to avoid the accident. While expressing sympathy with the relations of the man who lost his life, the court severely criticizes the custom of motor boats plying in harbors in charge of inexperienced and ignorant persons to the detriment of general traffic, as being a menace to life and property.

Furness, Withy and Company, Limited.

The report for the year ended April 30 shows profits of £885,245 19s. 5d., against £768,622, 2s 5d for the previous year. £350,000 was transferred to depreciation account, £50,000 to trade contingencies fund, and £75,000 to reserve

of the route, including as it does the flight of twin locks 4, 5 and 6, and the single lock 7, with the guard gates beyond. This section gives a change in elevation of 186 ft., and in consequence involves constructional work of a heavy nature.

The letting of tenders for sections 1 and 3 about the same time was necessitated by the "cut and fill" nature of the two sections. In section 1, at the entrance to Lake Ontario, there is to be a long breakwater extending into the lake a little over a mile, to be made from the cuttings from the heavier excavation work in section 3. In addition, all the stone to be used on the concrete work on the whole canal is to be supplied from section 3.

The Great North Western Telegraph Co. has closed its offices at St. Felicite, Que., and Merlin, Ont.

The Steamship Glenmavis for the Canadian Lakes Trade.

The steamship Glenmavis, which has been built at Londonderry, Ireland, for the James Playfair interests, is, it is said, intended to run between Montreal and Port Colborne.

As will be seen from fig. 1, the Glenmavis follows in general arrangement and outfit the standard practice evolved by experience for a vessel of her class. She differs, however, from other lake vessels in that she is the first of this type to be constructed on the arch principle devised by Maxwell Ballard, by which a considerable saving in weight of structural material is effected in comparison with the usual system of construction.

The leading particulars of the Glenmavis are: Length, over all, 256 ft.; length, b. p., 250 ft.; breadth, extreme,

peak ballast tank forward. The frames are of bulb angle section spaced 24 in. apart, except right forward, where the spacing is reduced to 21 in. and 18 in., as shown on the profile (fig. 2). The tank top is flush plated, in order not to interfere with the working of grabs, and has no ceiling. Fenders are fitted on each side for protection when passing through the locks.

There are five cargo hatchways, 12 by 28½ ft., with shallow bulb angle coamings, and one large hatchway aft, 26 by 28½ ft., by about 4½ ft. high. The latter provides extra capacity, and at the same time assists the trim of the vessel. The hatchways are spaced 24 ft. centres. Canadian canal steamers, as a rule, have no cargo gear on board, and none is shown in fig. 1, but it is understood that

purposes a steam winch is provided amidships and a steam capstan aft. The anchors are housed in pockets to avoid fouling the lock gates.

The accommodation follows the arrangement usually adopted in lake vessels. As will be seen from fig. 1, the officers and seamen are berthed in the forecabin, above which is a steel house containing the chart room and the captain's office and bedroom. Above the captain's house is the flying bridge, upon which is placed the wheel house. The engineers and firemen are accommodated in steel houses at the sides of the engine and boiler casing on the arch deck aft. In the after house are also arranged the galley and pantry, the officers' mess room, an ice house, and the mess room for the crew.

The vessel is propelled by a single screw, driven by a set of triple expansion reciprocating engines, having cylinders

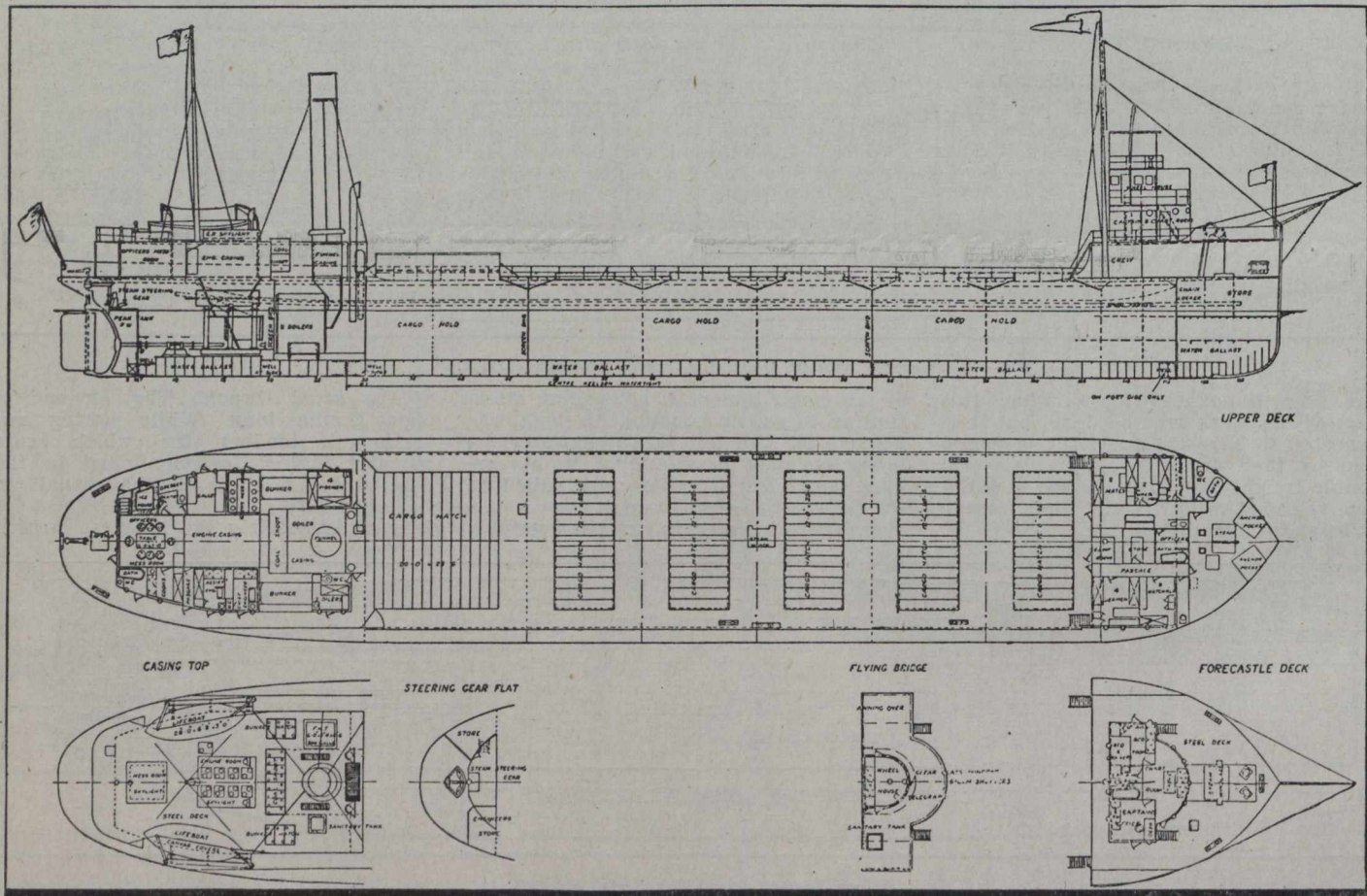


Fig. 1.—General Arrangement of the Glenmavis.

42½ ft.; depth, moulded to knuckle, 16 ft.; depth of arch, 4 ft.; total depth, 20 ft.; load draught, 14 ft.

The vessel has been classed with the British Corporation for service on the Great Lakes and the St. Lawrence River. Her structural design and scantlings are shown by the profile given in fig. 2, and the sections at an ordinary frame and a web frame given in figs. 3 and 4, respectively. It will be seen that the vessel has no sheer, the necessary height forward being secured by the adoption of a forecabin, while a bulwark is fitted round the stern aft. Following lake practice, the vessel has no 'tween decks, compensating strength being secured on the girder system, leaving the cargo hold free of all obstructions. A cellular double bottom for water ballast, with floors on alternate frames, extends all fore and aft, and there is also a large

the owners contemplate adding four winches with the corresponding cargo gear, masts, and derricks when the vessel reaches the lakes.

On account of the confined waters which the vessel navigates, a balanced rudder of large area is provided. The rudder is worked by a steam steering gear of special design, situated beneath the arch deck aft and controlled either from the navigating bridge forward or from a steering station on top of the after deck house. A reserve tiller is also provided on top of the arch deck, the rudder head being carried up through the deck for this purpose. To facilitate steering from the forward bridge, a steering pole is fitted at the stem to give the steersman a point to steer by. A powerful steam windlass is fitted under the forecastle deck, and arranged as shown on the plan, while for warping

16, 26 and 44 in., respectively, with a stroke of 30 in. Steam is supplied by two single ended cylindrical boilers, 12½ ft. diameter by 10½ ft. long, designed for 180 lbs. pressure and working under natural draught.

The particulars of this article have been abstracted from the Shipbuilder, Newcastle on Tyne, and it is understood that a duplicate is building.—Marine Review.

Additional illustrations of this vessel are given on the two following pages.

The Dominion Government wireless telegraph station at Port Arthur, Ont., was opened for business, Aug. 9. The site is on Dawson St., and is 650 by 150 ft. All apparatus is in duplicate, and in case of the failure of electrical power, the station is equipped with a generator driven by a gasoline engine of 8 h.p.

Toronto Harbor Improvements.

Tenders for the first portion of the Toronto harbor improvement scheme were invited by the Department of Public Works, to be sent in by Aug. 27, covering the portion of the work that is to be undertaken by the Government. This includes the ship channel 8,000 ft. long, through the new industrial area in Ashbridge's Bay, the eastern breakwater along the waterfront in front of Ashbridge's Bay, from the eastern channel to the Woodbine, 3 1/4 miles, the marginal way or bulkhead construction between the ship channel and the city side of Toronto harbor, and the western breakwater extending from the western channel to the Humber River, 4 miles. The eastern portion of the work will be of pile construction with mass concrete tops, and the western section, pile construction with concrete block tops. The extent of the work may be gathered from the following tables of the main quantities involved:

Eastern breakwater: Piles, 663,500 lin. ft.; hemlock lumber, 522,460 ft.; southern pine or B. C. fir, 8,594,136 ft.; concrete blocks, 28,912 cu. yds.; mass concrete, 5,763 cu. yds.; structural steel shapes, 3,645,850 lbs.; and stone talus 33,000 tons.

Western breakwater: Piles, 83,328 lin. ft.; cribwork, 162,000 cu. yds.; concrete blocks, 22,363 cu. yds.; mass concrete, 17,203 cu. yds.; reinforcing steel, 1,626,443 lbs.; structural steel, 1,865,570 lbs.; rock fill, 23,000 cu. yds.; and dredging, 48,515 cu. yds.

Ship channel: Piles, 1,290,534 lin. ft.; hemlock lumber, 691,260 ft.; southern pine or B. C. fir, 7,794,348 ft.; concrete blocks, 17,897 cu. yds.; mass concrete, 25,705 cu. yds.; structural steel, 3,755,220 lbs.; white oak or B. C. fir, 215,365 ft. and dredging, 3,078,000 cu. yds.

Marginal Way: Piles, 228,412 lin. ft.; hemlock timber, 490,300 ft.; southern pine or B. C. fir, 3,127,000 ft.; concrete blocks, 4,400 cu. yds.; mass concrete, 3,082 cu. yds.; reinforced steel, 372,667 lbs.; structural steel, 439,947 lbs., white oak or B. C. fir walling, 84,654 ft.; and dredging, 48,515 cu. yds.

E. L. Cousins, A. M. Can. Soc. C. E., is Harbor Engineer for the Toronto Harbor Commission, and J. G. Sing, M. Can. Soc. C. E. is Engineer in Charge for the Public Works Department.

Control of Ocean Freight Rates.—The question of Government control of ocean freight rates is being considered by commercial interests in Canada, and the Dominion Government proposes to take up the matter with the Imperial Government. The several departments interested have prepared statistical and other information necessary for the negotiations, which will be carried on on behalf of Canada by H. L. Drayton, Chairman of the Board of Railway Commissioners.

The construction of a tunnel under the Dover Straits, between England and France, is again to the fore, a deputation having recently waited on the British Premier to urge the taking up of the scheme. In reply, it was stated that the matter was engaging the Government's attention. Three schemes for improved means of transportation between the two countries are under discussion, and each has been declared to be quite feasible. In addition to the tunnel project, a bridge is suggested, and also a system of car ferries similar to those operating in Denmark, and between Canadian and U.S. ports.

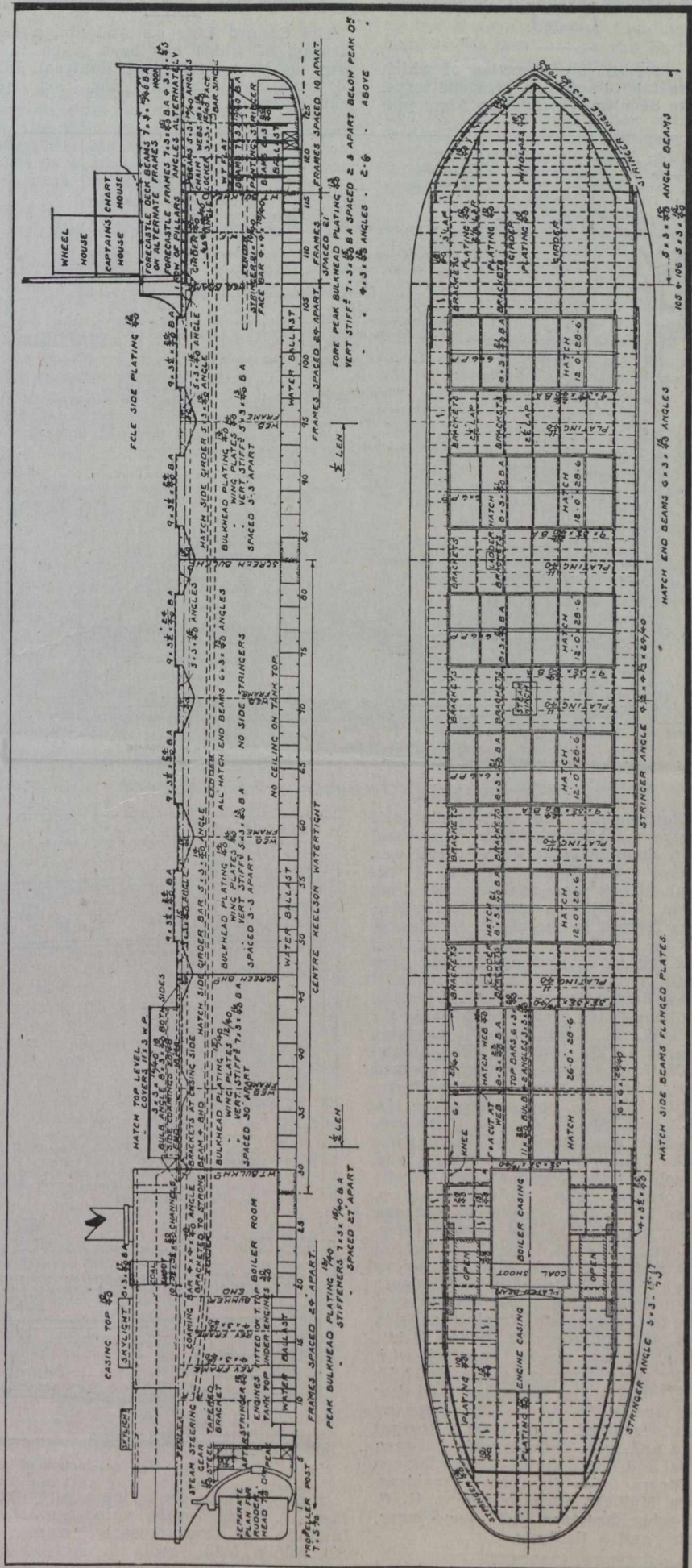


Fig. 2.—Profile and Deck Plan of the Glenmavis.

The National Steamship Company, Limited.

This company, incorporation of which has been mentioned in a previous issue, will take over the steamboats Algonquin

Atlantic and Pacific Ocean Marine.

The Cunard Line s.s. Andania, a description of which has been given in a previous issue, arrived at Montreal, July 26, from Southampton, Eng., on her maiden trip.

The C.P.R. s.s. Empress of Russia arrived at Victoria, B.C., on her second trip from Yokohama, Japan, in 8 days, 18 hours, thus making a new record.

The French Line s. s. La Touraine, running between Montreal and Havre, France, has, it is announced, discontinued the service owing to the lack of freight.

The Canadian Northern Steamships' s.s. Royal George, which sailed from Montreal, July 26, and arrived at Bristol, Aug. 2, made a new record of 3 days and 19 hours from land to land.

The Navigazione Generale Italiana inaugurated its Canadian service with the calling of the s.s. Palermo at Halifax, N.S., July 25. The voyage from Naples to Halifax was done in 14 days.

The Judicial Committee of the Privy Council delivered judgment, Aug. 1, in the appeals of the C.P.R. and the s.s. Montcalm, in connection with the sinking of the s.s. Kronprinz Olav in the St. Lawrence River, in Sept., 1910. It was held that no blame could be attached to the Montcalm.

During July, 71 ocean going steamships, with a tonnage of 469,529, entered Montreal harbor, compared with 62 steamships and 425,228 tons during July, 1912. From the commencement of the St. Lawrence navigation season, to July 31, 227 vessels entered the port as against 189 during the same period 1912.

The C.P.R. s.s. Empress of Asia was expected to arrive at Vancouver, B.C., Aug. 30, from Great Britain, by way of South Africa, Ceylon and Hong Kong, with a large party of tourists taking a trip round the world by the C.P.R. She is scheduled to leave Vancouver, Sept. 10, on her first trip from Canada to the Orient.

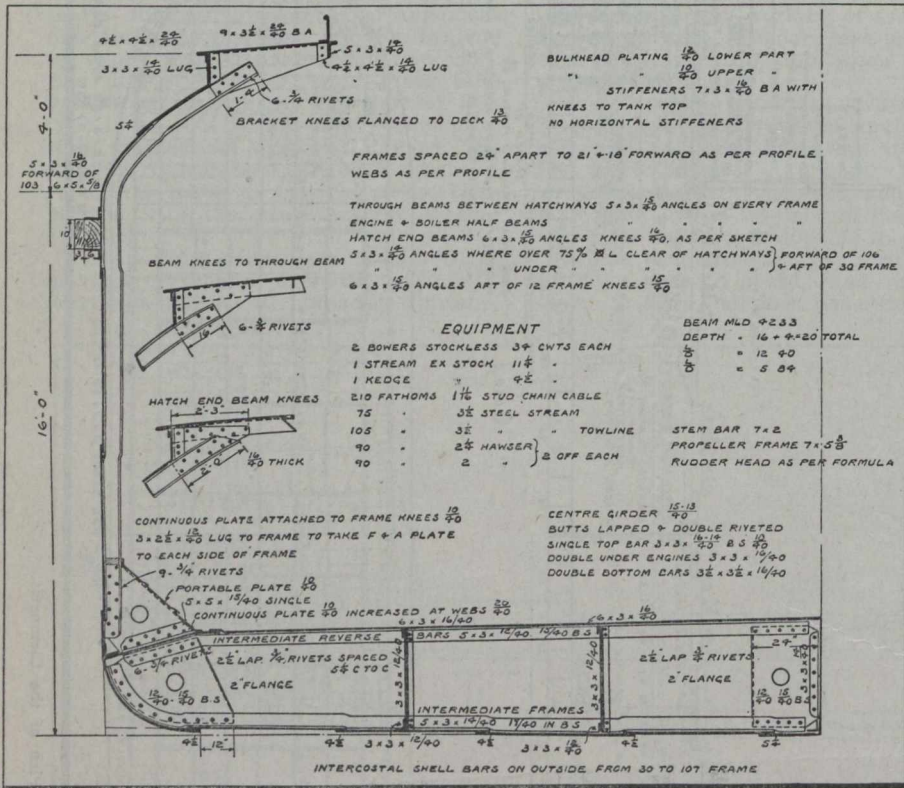


Fig. 3.—Section of the Glenmavis at an Ordinary Frame.

and Natironco. The Algonquin was formerly owned by the St. Lawrence and Chicago Steam Navigation Co., and was purchased by Cawthra Mulock of Toronto about two years ago, when the Port Colborne and St. Lawrence Navigation Co. was formed to operate it, in connection with the Maple Leaf Milling Co., with which he is also associated. She was built at Yoker, Scotland, in 1888, and is screw driven by engine of 150 n.h.p. Her dimensions are, length 245 ft., breadth 40.1 ft., depth 20.6 ft.; tonnage, 1,806 gross, 1,172 register. The steamboat Natironco was formerly named Pioneer, and was owned by the Cleveland-Cliffs Iron Co., and operated by the Grand Island Steamship Co., Cleveland, Ohio. She was purchased by Canada Interlake Line, Toronto, last year, and later, sold to the National Iron Works Co., Toronto, with which company, Cawthra Mulock is associated, and she has been operated by the Canada Interlake Line. She was built at Detroit in 1892, and is of steel. Her dimensions are, length 226 ft., breadth 35 ft., depth 18 ft.; tonnage, 1,123 gross, 774 register, and she is equipped with triple expansion engines, with cylinders 20, 35 and 54 ins. diam., by 42 ins. stroke, supplied with steam by two Scotch boilers, each 12 by 11 1/2 ft. at 165 lbs. pressure, and her engines are of 900 i.h.p. The company is being organized to carry on a general package and bulk freight trade between Montreal and Port Arthur. Following are the officers and directors,—President, Cawthra Mulock; Vice President, G. F. Perry; other directors, E. H. Laschinger, M. Stobie and J. B. Foote.

The Canadian Northern Telegraph Co. has opened an office at D'Arcy, Sask.

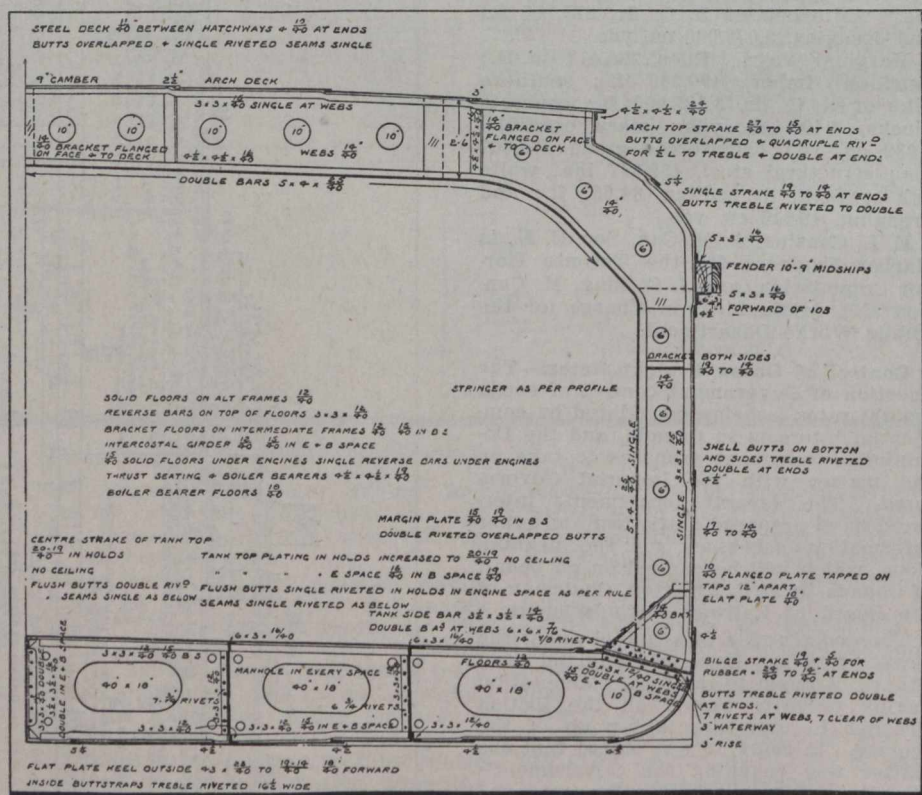


Fig. 4.—Section of the Glenmavis at a Web Frame.

The s.s. Diana, conveying a party from the U.S. to the Arctic, which ran ashore in Belle Isle Strait recently, returned to St. John's Nfld., badly damaged. The party transferred to the s.s. Erik and sailed for Crocker Land early in August.

The Cairn Line s.s. Bellona, which stranded in the upper traverse of the St. Lawrence River, Oct. 31, 1912, and which has since been lying in a damaged condition at Quebec, is reported to have been purchased by a New York syndicate,

who, it is stated, intend having her overhauled and repaired for use in the West Indies fruit trade.

The C.P.R. s.s. Lake Manitoba grounded during a fog off the Isle of Orleans, July 29, and sustained considerable injury to her hull. She proceeded to Montreal and landed her passengers, after which a thorough examination was made in the dry dock, when it was discovered that the repairs required were too great to be undertaken there. She subsequently sailed for New York, where the repairs were undertaken.

An Ottawa press report states that the Government has made arrangements for the subsidizing of a line of grain carrying steamships for the Hudson Bay route, and that a member of a well known shipping firm associated with the Great Lakes carrying trade has been in conference on the subject and will shortly leave for England to conclude arrangements for a number of tramp steamers for such service.

It is unofficially announced that the Allan Line steamships Alsatian and Calgarian, both of which were expected to make their maiden trips to the St. Lawrence this season, will not be completed in time to do so, but it is probable that their maiden trips to Canadian ports may be made during the winter, should the company, as is customary, undertake relief sailings for the C. P. R. Empress steamships, which are both to have thorough overhauling at the close of the St. Lawrence season.

Maritime Provinces and Newfoundland.

The Dominion Coal Co.'s s.s. Wabana, which was recently damaged through grounding near Matane, Que., while proceeding from Sydney, N.S., to Montreal, has been repaired at Quebec and returned to service.

The s.s. Beothic, under charter to the Dominion Government for a trip to Hudson Bay ports, which ran aground off Point Rich, on the northwest coast of Newfoundland, returned to Halifax, after being released, for examination and repairs.

The s.s. Terra Nova, the vessel utilized in the recent Scott Antarctic Expedition, and which has been associated with the Newfoundland sealing industry for several years, has been repurchased by C. T. Bowring and Co., and will be placed in its old service.

The Deputy Minister of Public Works has written to the Traffic Committee of the Board of Trade at St. John, N.B., that the tender of John S. Metcalf Co., Montreal, for the erection of grain conveyors to berths 5 and 6, was approximately \$133,000, and that the matter was under consideration.

The dredging of the bar in St. John, N.B., harbor by the Public Works Department was expected to have reached the stage, during August, when the removal of the lighthouse marking the outer edge and the pier would be necessary. It is arranged that a gas and bell buoy is to be established at that point, and moved as dredging progresses, so that it will always mark the limit of width available for navigation, and range lights will also be established to mark the axis of the new dredged channel.

An order in council has been passed defining the pilotage limits of the port of Pictou, N.S., as from the most easterly point of Pictou Island on a line running southeast until it strikes the gulf shore at Arisaig pier, and bounded on the west

by a line drawn from Amet Island to Rocky Point at the county line, and embracing all the navigable waters in Pictou County. These are the limits as they were prior to July 21, 1908, when they were extended, the extension having been cancelled as it has been pointed out by the Pilotage Authority that vessels frequently get inside the limits without sighting a pilot, and that the old limits are ample for all purposes.

Province of Quebec Marine.

The Magdalen Island Steamship Co. s.s. Lady Sybil ran aground near Magdalen Islands, July 29.

The steamboat John Sharples which recently struck a rock near Chicoutimi, Que., cutting a hole in her stern, has been repaired at Montreal.

The Montreal Harbor Commissioners entertained to luncheon, Aug. 12, Dr. I. M. Goldstein of Moscow, Russia, who is making a study of matters concerning navigation.

The Montreal Harbor Commissioners have inaugurated a police force for duty within the limits under their jurisdiction. The present force of 20 will probably be increased to 40 by the fall.

The Quebec Board of Trade has pointed out to the Minister of Public Works the desirability of establishing a ship building and repair plant in connection with the projected Government dry dock at Lauzon, Que.

The steamboat Duchess of York, owned by the King Edward Park Co., Montreal, struck a rock while passing through the Lachine Rapids, Aug. 2, cutting a hole in her hull. The damage was repaired temporarily, and the passengers landed safely at Montreal, after which she was dry docked for repairs.

It is reported that the Montreal Harbor Commissioners have decided not to proceed with the addition of 250 ft. to the outer ends of the Alexandra, Jacques Cartier and King Edward piers, until the entrance to the Lachine Canal has been remodelled, on the ground that the work would only add to the congestion of the upper harbor.

A number of members of the Montreal Board of Trade, Chambre de Commerce, and the Canadian Manufacturers' Association, on Aug. 12, presented a large silver punch bowl to each of the ex-members of the Montreal Harbor Commission, G. W. Stephens, L. E. Geoffrion and C. C. Balantyne, in recognition of their work towards the development of trade through the Montreal harbor.

The Crown Steamship Co., owners of the s.s. Crown of Cordova, has taken proceeding in the Admiralty Court, for the arrest of the s. s. Lady of Gaspe, on a claim for \$35,000 as damages, arising out of the collision. It is reported that the Magdalen Islands Steamship Co., owner of the s. s. Lady of Gaspe, will enter a counter action. The Dominion Wreck Commissioner held an enquiry at Quebec, Aug. 7.

Arrangements have been completed for the diversion of small vessel traffic from the ship channel in the St. Lawrence, to the north channel, thus relieving considerable congestion of small craft, which has for some time been more or less of a menace to the safe navigation of the channel by ocean going vessels. The north channel is being well lighted, twelve range lights having been established between Repentigny and Contrecoeur.

The harbor police force, inaugurated by the Montreal Harbor Commissioners, commenced duty within the harbor limits, Aug. 12. It will not in any way interfere with the city police, but will, in addition to regulating traffic on the wharves, act in conjunction with them in dealing with general delinquents. The uniform adopted is of khaki, with brass buttons, and cap bearing the Commissioners' crest.

It is reported that the Department of Marine has decided to order an additional ice breaking steamship for the St. Lawrence service, approximately of the following dimensions: Length 275 ft., breadth 57½ ft., depth 30 ft., with engines of about 8,000 i. h. p. It is stated that the forward construction will be similar to that which is being adopted on the ice breaking car ferry steamship for the Northumberland Strait, now under construction in England.

The Montreal Harbor Commissioners have decided to build another elevator with capacity for about 3,000,000 bush. It is stated that it will be utilized specially for the export trade, in order to relieve the congestion caused by allowing grain to be stored in the others. It will be located in the east end of the harbor in such a position that grain can be taken in at one side and discharged on the other. The total capacity of the elevators in the harbor will then be raised to 10,732,000 bush.

The various works in the Montreal harbor are progressing satisfactorily. The concrete substructure for the addition to the Harbor Commissioners' elevator is approaching completion, and the concrete for the superstructure will be run in during September. The concrete superstructure for the G. T. R. elevator is complete to a considerable height, and work is being rushed day and night. The high level wharf at sec. 26 is about completed, and foundations have been laid for another similar one.

The Department of Marine has established a lighthouse on the north shore of the Ottawa River, on the sandy point about a quarter of a mile below Pointe au Chene village, and it is directed that up-bound vessels will use this light as a leading mark from a point abreast of L'Original wharf, in the alignment of the light and Pointe au Chene church, until clear of Furniss Point, and from thence a more westerly course should be taken so as to pass about a quarter of a mile south of the light whence McTavish Point light will be used as a leading mark.

The s.s. Lady of Gaspe, owned and operated by Bouchard Bros., Quebec, to Gaspe ports, was rammed by the British s.s. Crown of Cordova, while at anchor, during a fog, near Cap Madeleine, July 28. The passengers were landed safely at Cap Madeleine, and the vessel beached. She was released July 31, and went to Quebec under her own steam in charge of the wrecking tug Lord Strathcona. She was built at Glasgow, Scotland, in 1877, and has borne the names Restigouche and Rathlin. She is screw driven with engine of 180 n.h.p., and her dimensions are, length 229.7 ft., breadth 31 ft., depth 16.1 ft.; tonnage, 1,189 gross, 705 register.

Ontario and the Great Lakes.

The Pelee Island Transportation Co. is having a steamboat built at Collingwood. The ice breaking steel steam tug,

James Whalen II., was launched at Port Arthur recently.

The Dominion Government has awarded a contract for dredging at Sault Ste. Marie, to the Soo Dredging and Construction Co., for \$162,000.

Passenger traffic on Lake Ontario has, during this season, shown remarkable gains over last year. It is stated that the increase will be practically 35%.

The Northern Navigation Co.'s s.s. Saronic met with an accident to her machinery in Lake Huron, July 28, and was towed into Sarnia, where repairs were made.

The Public Works Department will receive tenders to Sept. 2 for the reconstruction of a part of the superstructure of the east pier of the eastern entrance to Toronto harbor.

The Toronto Harbor Commissioners have sold \$1,500,000 of bonds in New York, at 89½. Tenders are being asked for the carrying out of harbor improvement work, to cost approximately \$6,000,000.

The Detroit and Walkerville Ferry Co.'s new steamboat Essex has been placed in service between Walkerville and Detroit. She has been specially built to encounter ice, at a cost of about \$75,000.

The Marine Department has under consideration tenders for the construction of a steel and concrete lighthouse, equipped with powerful modern light, to be erected on Main Duck Island in Lake Ontario, to replace the existing one.

The taking over the Canada Interlake Line, by the Canada Transportation Lines, proceeded during August, payment for the shares deposited in accordance with the terms of the agreement being made towards the latter part of the month.

The Prescott and Ogdensburg Ferry Co.'s s.s. City of Belleville, during one of her trips between Ogdensburg and Prescott, July 28, broke a portion of her machinery, which cut a hole in her hull, causing her to sink in the harbor at Ogdensburg.

The steamboat Glen Mavis, built for the Canadian lake trade, arrived at Montreal, from Londonderry, Ireland, towards the end of July. She will run this season between Montreal and Port Colborne, and is of full canal size with capacity for 80,000 bush.

The Richelieu and Ontario Navigation Co. was, on Aug. 15, at Brockville, fined \$100 in each of three charges, for selling intoxicating liquor on board the s. s. Thousand Islander. It was stated that the prosecution only consented to the minimum fine, on the company undertaking not to repeat the offence during the remainder of the season.

Canada Interlake Line, as owning the s. s. Mapleton, has libelled the Great Lakes and St. Lawrence Transportation Co.'s s. s. George C. Howe, for \$3,500 damages alleged to have been caused by a collision in the Welland Canal recently. The vessel, which was held at St. Catharines, was released, Aug. 14, the amount having been paid into court.

The Department of Marine has arranged that all wireless telegraph stations under the control of the Department of Naval Service, from the head of the Great Lakes, eastward, throughout Canada and Newfoundland, are provided with the weather forecasts issued daily by the Meteorological Service, and these will be transmitted to

any vessel asking for them, free of coast station charges.

In continuation of the reorganization of the Richelieu and Ontario Navigation Co., and the absorption of other lines, as indicated in previous issues of Canadian Railway and Marine World, J. W. Norcross, Managing Director, Canada Interlake Line, Toronto, and J. P. Steedman, Hamilton, Ont., have been elected directors, in place of E. Bristol, K.C. M.P., and G. Morden, who retired.

A Chicago press report states that by Sept. 1, there will be inaugurated the first regular waterway service between the Great Lakes and the Gulf of Mexico. The proposed service will be for both passengers and freight, and will be from Chicago to La Salle, Ill., by barges through the Chicago drainage canal; at La Salle transfer will be made to steamboats which will continue down the Illinois and Mississippi Rivers to New Orleans.

In order to protect navigation from the plant used by the City of Toronto in boring operations and subsequent work in connection with an extension of the city's water supply, the Department of Marine has placed a gas buoy off Pictoria Park, approximately 4 miles east of the eastern pier of the eastern entrance to Toronto harbor. The buoy is maintained by the city and will probably be required until the close of navigation next year. Vessels should pass outside the buoy.

The U. S. Lake Survey reports the levels of the Great Lakes in feet above tide-water, for July, as follows: Superior, 602.57; Michigan and Huron, 581.26; Erie, 573.58; Ontario, 247.83. Compared with the average July levels for the past ten years, Superior was 0.03 ft. above, Michigan and Huron 0.19 ft. above, Erie 0.74 ft. above, and Ontario 0.88 ft. above. It was anticipated that during August, Superior would rise 0.1 ft., Michigan and Huron remain stationary, Erie fall about 0.2 ft., and Ontario fall about 0.3 ft.

Dredging is proceeding in Fort William harbor, at various points. Eight dredges are being operated at the entrance to the Kaministikwia River, an along the McKellar and Mission Rivers. The chief work is being carried on in the McKellar River, where, it is anticipated, that by the end of the season, the river will have been widened to about 400 ft., for a distance of 2,200 ft. The channel on the Mission River, at present about 300 ft. wide, will when completed be 600 ft. wide, and 4,300 ft. long.

The dry dock which the Polson Iron Works was about to build at Toronto has been further delayed on account of the revised plans for the projected viaduct across the water front providing for cutting through a portion of the site selected. A new site will have to be arranged for, and as soon as this is done, it is expected that the work will be rushed through. The dock will be 335 ft. long by 100 ft. wide, and 35 ft. 4 ins. deep, of sufficient size to accommodate any of the vessels plying on Lake Ontario.

Work on the Lake Ontario end of the Trent Valley Canal, between Trenton and Hastings, will, it is anticipated, be finished during 1914, and be ready for operation by 1915, thus giving water connection between Lake Ontario and Orillia. Tenders will be asked shortly for the Port Severn section at the Georgian Bay end, and the remainder between Port Severn and Lake Couchi-

ching will be let in three sections towards the end of the year, and it is hoped that the whole work will be completed in 1915.

The Keystone Transportation Co.'s s.s. Keyvive, which was recently launched at Southbank-on-Tees, Eng., is of the same type as the company's other vessels, and is of full canal size with a deadweight capacity of about 2,300 tons on 14 ft. draught. She is equipped with triple expansion engines with cylinders 16, 26 and 43 ins. diam., by 33 ins. stroke, supplied with steam by two boilers. Practically the only difference between this, and other lake type freighters, is the provision of staterooms, observation room, etc., forward. Her dimensions are, length, 250 ft.; breadth, 42½ ft.; depth, 20 ft.

The Erie and Western Transportation Co.'s s.s. Lehigh, while bound to Montreal with coal, Aug. 2, entered lock 23 of the Welland Canal at too great a speed and crashed into the lower gates, breaking them off to within 8 ft. of the bottom. The rush of water carried the vessel to the lower level towards lock 22, from which the Montreal Transportation Co.'s s.s. Fairmount was emerging, and to avoid collision with a vessel was steered into the stone abutment. The damage to the Lehigh consisted chiefly of a broken propeller and a hole in the hull. The lock gates were repaired and traffic resumed after an interruption of 18 hours.

The first of two large bucket dredges under construction for the Dominion Government for use in the St. Lawrence ship channel was launched at Collingwood recently. It has been built under Lloyds' special survey for the dredge class 100 A1, and will be propelled by triple expansion engines with cylinders 15, 25 and 42 ins. diam., by 26 ins. stroke, supplied with steam by two Scotch boilers, each 10½ by 10½ ft., at a pressure of 180 lbs. Special gearing will be arranged so that the main engine can be disconnected from the propeller shaft and connected to operate the buckets. There will be 40 buckets each with 27 cub. ft. capacity. The chief dimensions of the dredge are, length, 215 ft.; breadth, 37½ ft.; depth, 14 ft.

Manitoba, Saskatchewan and Alberta.

The Dominion Government is reported to have completed plans, involving the expenditure of about \$3,000,000 during the next 10 years, for the making of the North Saskatchewan River navigable at all times during the open season.

A North Battleford press dispatch states that negotiations are in progress with the representatives of a U. S. concern, for the acquirement of wharfage facilities on the North Saskatchewan River, at Prince Albert, Sask., and Edmonton, Alta., between which points it is proposed to operate a line of steam packets and tow boats, next season.

British Columbia and Pacific Coast Marine.

The Minister of Marine, while in Victoria recently, opened the temporary quarters of the Connaught Seamen's Institute.

The Vancouver Harbor Commission has been appointed as follows: F. L. Carter-Cotton, Chairman; Jas. A. Fullerton and Samuel Clay.

The Dominion Public Works Department will receive tenders, to Sept. 2, for

the construction of an extension to the breakwater at Upper Salmon River, and to Sept. 8, for the construction of a wharf in Victoria harbor.

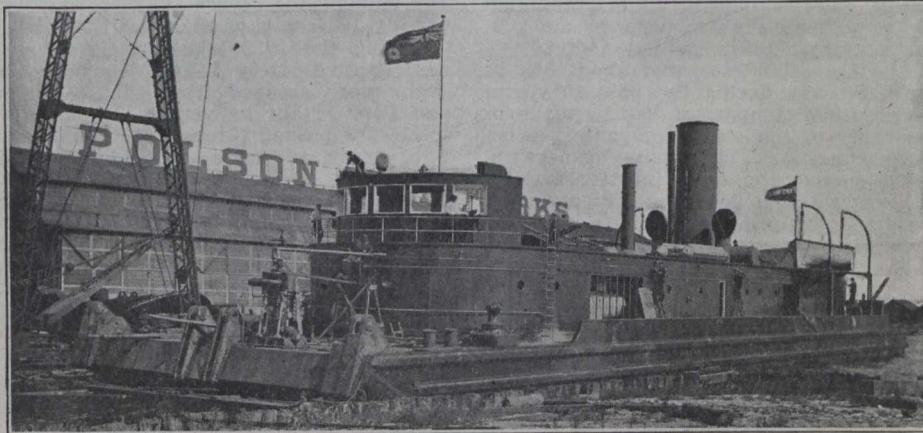
The Dominion Government has awarded contracts to the Pacific Dredging Co., for \$158,200, for dredging in Pitt River, and to Broley and Martin, New Westminster, for \$83,500, for the completion of construction of a jetty at Steveston.

Press reports from New Westminster state that the Dominion Public Works Department has arranged for a survey of the Fraser River between Mission and Hope, with a view to clearing the channel and carrying out some dredging work.

The New Westminster city dredge John A. Lee, was launched there, July 30. It is the first of the city's dredges to be built locally, and it is expected it will be ready for operation about October. The dimensions are, length 100 ft., breadth 40 ft., depth 7½ ft.

The Norwegian s.s. Herakles was drydocked at Esquimalt, early in August, for examination after she grounded in the Fraser River, when just completing her voyage from Sydney, N. S., to Port Mann, B. C., with rails for the Canadian Northern Ry.

The C.P.R. s.s. Princess Maquinna sailed from Victoria, July 25, on her



Twenty-four Inch Steel Hydraulic Dredge, Port Nelson.

maiden trip to northern ports. George Bury, Vice President, was present when she left, while J. W. Troup, Manager, British Columbia Coast Service, went with her to Holberg.

The s.s. Rupert City, formerly owned by the Marine Transportation Co., Vancouver, was sold at Seattle, Wash., Aug. 9, by order of the Federal Court, to N. C. Hardie of Vancouver, for \$16,000, the value of the vessel being stated at \$60,000. She was built at Barrow in Furness, Eng., in 1886, and is screw driven by engine of 300 n. h. p. Her dimensions are, length 310.3 ft.; breadth 38.1 ft.; depth 25.2 ft.; tonnage, 2,536 gross, 1,640 register.

The Department of Marine has placed two fixed red lights, 6 ft. apart vertically, on the breakwater under construction at the entrance to Victoria harbor, extending out westerly from Ogden Point on the east side of the entrance. These lights are placed on a dolphin about 1,000 ft. out from Ogden Point, and will be moved out as the work progresses, to show its extremity. The lower light will be elevated about 20 ft. above high water.

The Dominion Government fishery cruiser Malaspina was launched at Dublin, Ireland, recently, and a second one

will follow shortly. These two vessels are for service on the Pacific coast. They are divided by transverse and longitudinal bulkheads into 20 watertight compartments. The propelling machinery will be triple expansion engines supplied with steam at 180 lbs. by marine type boilers equipped with Howden's forced draught. Their dimensions are, length, 162 ft.; breadth 27 ft.; moulded depth, 13 ft. 11 ins.

Canadian Notices to Mariners.

The Department of Marine has issued the following:—

249. July 15. Atlantic Ocean to head of the Great Lakes, weather probabilities communicated from wireless telegraph stations.

250. July 16. Ontario, Georgian Bay, east side, Roberts Island, Honey Harbor channel, buoys established.

251. July 16. Ontario, Georgian Bay, east side, eastern approach to Parry Sound, buoys established.

252. July 17. New Brunswick, south coast, Bay of Fundy, entrance to St. John, shoal being dredged, beacon light and fog bell to be removed, gas buoy to be placed.

253. July 17. Nova Scotia, Cape Breton Island, west coast, entrance to east-

264. July 31. British Columbia, weather probabilities communicated from wireless telegraph stations.

265. July 31. Quebec, River St. Lawrence, Lake St. Louis, change in position of Lachine gas buoy.

266. July 31. Ontario, Lake Ontario, Oakville, change in character of light.

267. July 31. Ontario, Lake Erie, Port Colborne, change in characteristic of front range light.

268. Aug. 6. New Brunswick, south coast, Letite Passage, entrance to Letite harbor, gas and bell buoy established.

269. Aug. 6. New Brunswick, south coast, Bay of Fundy, Sisters Rocks, can buoy to be replaced by bell buoy.

270. Aug. 6. Nova Scotia, Chignecto Channel, Cumberland Basin, westward of Amherst Basin, change in position of buoy.

271. Nova Scotia, south coast, Mahone Bay, Tanner Pass, Tanner Island, lighthouse established.

272. Aug. 11. Quebec, Gulf of St. Lawrence, Gaspé coast, Barachois de Malbaie, change in position of pole light.

273. Aug. 11. Quebec, River St. Lawrence below Montreal, Repentigny, change in position of range lights.

274. Aug. 12. Ontario, Detroit River, Ballard Reef channel, temporary changes in positions of gas buoys.

275. Aug. 12. Ontario, Lake Huron, north channel, chart, Meldrum Point to St. Joseph Island, issued.

276. Aug. 12. United States of America, River St. Mary, Brush Point range light station, new structures erected and changes made.

277. Aug. 13. Nova Scotia, Bay of Fundy, Lurcher shoal, lightship to be removed from her station temporarily for repairs.

278. Aug. 13. Quebec, Gulf of St. Lawrence, off Fame Point, submarine bell buoy to be placed.

Suction Dredge for Dominion Government Harbor Work in Hudson Bay.

A description of the new 24 in. suction dredge for harbor work in Hudson Bay, appeared in Canadian Railway and Marine World for July. The first work on this dredge was begun in April last, and as the work was required to be completed by August in order that the dredge might be towed to Hudson Bay before severe winter set in, extraordinary means had to be applied to push forward the work. The Polson Iron Works, which had the contract, completed the task in the remarkably short time of 100 working days, the dredge leaving Toronto for the far north on Aug. 9, following the St. Lawrence route to Sydney, and thence along the Labrador coast line into Hudson Bay.

Briefly, the dredge, which is illustrated on this page, is 180 by 43 ft., weighing complete 1,200 tons. It is divided into six watertight compartments. In the forward end of the hold is a 24 in. suction pump, direct connected to a triple expansion engine, supplied from two Scotch boilers. A cutter arm is carried on the forward end by shear legs, with the cutter driven from a small vertical engine alongside on the forward deck. The discharge from the pumps is through the rear of the dredge to a chain of floating pipes. An interesting feature of the dredge is a completely equipped machine shop. The complete control of the dredge is from the cabin on the forward bridge.

ern harbor, Cheticamp, buoys established.

254. July 17. Quebec, River St. Lawrence, Quebec harbor, Diamond harbor, piers off Lampson Cove, pole lights.

255. July 18. Quebec, River St. Lawrence below Quebec, Stone Pillar lighthouse, lantern damaged by fire, temporary light.

256. July 18. England, southwest coast, Scilly Isles, Bishop Rock light, alteration in period.

257. July 19. British Columbia, Vancouver Island, southeast coast, Victoria harbor entrance, Ogden Point, breakwater under construction, lights.

258. July 23. Quebec, Ottawa River, Pointe au Chene, lighthouse established.

259. July 23. Ontario, Lake Ontario, Toronto, gas buoy placed temporarily.

260. July 23. United States of America, Lake Superior, Manitou light station, characteristic of light changed and intensity increased.

261. July 23. United States of America, Lake Superior, off east end of Isle Royale, Blake Point, gas and bell buoy established.

262. July 24. Quebec, River St. Lawrence, Green Island, change in character of light.

263. July 28. Prince Edward Island, east coast, Murray harbor, bell buoy established, list of buoys.

Insurance Rates on the Atlantic Route.

The question of insurance rates on vessels and cargoes arriving at or departing from Canadian ports is of such great importance to the trade of the Dominion generally that no opportunity should be lost of urging on those chiefly concerned the desirability of bringing such rates more into conformity with those charged on vessels trading with other ports on the continent.

The Shipping Federation of Canada, the Dominion Marine Association, and the Canadian Manufacturers Association, have at various times taken this matter up with the Government, and although on some points there have been slight modifications, it is still evident that Canada is being discriminated against by the underwriters so far as the rates of marine insurance upon the St. Lawrence, and in fact in the whole of British North America, are concerned.

The Department of Trade and Commerce has recently prepared a statement of the rates of marine insurance between Canadian Atlantic ports, including those in the Gulf of St. Lawrence and the Bay of Fundy, and ports in the United Kingdom, also between Boston and New York and ports in the United Kingdom, and what change, if any, has been effected in the rates between Canadian and United Kingdom ports by the establishment of aids to navigation during the past ten years. The statement shows the various rates for each year from 1903 to 1912 inclusive, but for purposes of comparison the rates on hulls for 1903 and 1912 only are quoted, as follows:

Name	1903	1912
Allan	8s 0d	87s 6d, 92s 6d, 100s 0d
C. P. R.	84s 0d	105s 0d, 107s 6d, 110s 0d
Donaldson Elder Dempster	150s 0d, 180s 0d, 120s 0d	120s 0d excess of 3% partial damage.
Furness, Withy and Manchester Liners.	168s 0d	120s 0d
Thomson	160s 0d, 200 0d, 252s 0d	160s 0d to 360s 0d
Oceanic Steam Nav. Co.		75s 0d

The above rates are in shillings per £100. Changes in rates are in some cases due to different policy conditions, these being affected by a variety of conditions. Insurance which is not covered by the underwriters is undertaken by an indemnity club, a mutual association of shipowners who take certain risks, such as under 3%, accidents to crews, etc.

It would appear from the figures given that there has been a general increase in the rates on hulls since 1903. The rates on vessels trading between United States ports and the United Kingdom for 1903 and 1912 were as follows:—

Name	1903	1912
Allan	80s 0d	87s 6d, 92s 6d, 100s 0d
Atlantic Transport	50s 0d, 60s 0d, 70s 0d	15s 0d in excess of £200,000.
American Line	80s 0d	
White Star	50s 0d	
Furness, Withy and Manchester Liners	126s 0d	120s 0d
Hamburg American	27s 6d total loss	20s 0d total loss and general average.
North German Lloyd	60s 0d	
Cunard	50s 0d, 60s 0d	50s 0d to 100s 0d

It will be noted from this that the rates on the Allan Line vessels are the same in each case, Montreal being the chief Canadian port in the summer, and Portland, Me., the chief port in the winter, and that the rates on the Furness Withy, and Manchester Liners, are also the same for Canadian ports as for U.S. ports, there being a reduction of 28½% in the Canadian rate, and about 5% in the U.S. rate, during the past 10 years. No practical comparison can be made in the cases of the other companies, as so many conditions, comprising ownership, age of vessel, etc., enter into the making of a rate. The rates on cargoes, and more especially on grain, are perhaps of more direct importance to the Great Lakes trade, as it is claimed that that is the cause of such a large proportion of Canadian grain passing through U.S. channels. The average season rate of insurance on grain from the St. Lawrence to United Kingdom ports, with the

exception of Manchester, was 25½c for each \$100 insured, the Manchester rate being 32½c, and for tramp steamers with full cargoes of grain, 61c. As against this, the rates, via New York, Boston, etc., were 15c in first class vessels, 17½c in second class vessels, and 50c in tramp steamers with full cargoes of grain. Since 1909, when the rate on the St. Lawrence was 35c, for Manchester 39c, for tramp steamers 80c, and the U.S. port rates 17½c and 20c, for first and second class vessels respectively, and 50c for tramp steamers, there have been reductions of 9½c in the St. Lawrence rate, 6½c for Manchester, and 19c for tramp steamers; and in the U.S. rate a reduction of 2½c, the rate for tramp steamers remaining stationary. Although this comparison of rates serves a certain purpose, it should not be taken as a perfectly fair one, as towards the close of the St. Lawrence navigation season, when there is apt to be a rush of grain shipments, the insurance rate is increased materially, while, of course, the U.S. rate is the same all the year round. Thus, during the 1912 season, the rates were as follows:—May 1 to Sept. 15, 25c; to Sept. 30, 27½c; to Oct. 15, 30c; to Oct. 20, 37½c; to Nov. 15, 40c; and to the close of navigation, 45c; all to Liverpool. On the winter routes from Halifax, or St. John, the rate is 22½c, against the U. S. rate of 15c, while the rate on Furness Withy and Manchester Liners for 1912 was 30c, exactly 100% higher than the U.S. rate.

During the 1912 lake navigation season, approximately 113,000,000 bush. of grain were shipped from Fort William and Port Arthur by vessels, and of this total 41% passed through U.S. channels. The estimated value of grain shipped from Montreal during 1912 is \$25,000,000, which, if insured at the average rate in 1900 of 56c, would have cost \$140,000; and at the 1912 rate of 25½c, \$63,750, a saving in 12 years of \$76,250. The extra cost of shipping via Montreal, as against New York, on the same basis, would have been \$90,000 in 1900, and \$26,250 in 1912, showing a reduction in extra cost of \$63,750.

List of Steam Vessels Registered in Canada during July, 1913.

No.	Name	Port of Registry	When and Where Built	Length	Breadth	Depth	Gross Tons	Reg. Tons	Engines, Etc.	Owner or Managing Owner
133535	Acadia	Ottawa	1913 Newcastle, Eng.	170 0	33 7	19 1	846	439	177n.h.p. sc.	Swan Hunter and Wigham Richardson, Wallsend Eng.
133867	Digges	Vancouver, B. C.	1880 Victoria, B.C.	69 3	14 2	6 7	64	44	20 "	A. R. Bissett, Vancouver, B. C.
133933	Geo. Bothwell	Ottawa	1913 Buckingham, Que.	72 8	15 6	6 6	71	42	14 "	River Lievre Navigation Co., Buckingham, Que.
127549	H. C. Henry	Vancouver, B. C.	1909 Greenock, Scotland	360 0	49 0	26 9	4219	2553	446 "	Stemer H. C. Henry Ltd., Vancouver, B. C.
133861	Hero No. 1	Vancouver, B. C.	1902 Ballard, Wash.	50 4	14 9	6 2	31	21	14 "	City of New Westminster, B. C.
133932	Karluk	Ottawa	1884 Benicia, Cal.	125 6	27 0	14 2	321	208	31 "	Minister of Naval Service, Ottawa
133741	Natironco	Toronto	1892 Detroit, Mich.	225 0	35 0	13 7	1079	542	46 "	Canada Interlake Line Co., Toronto (2)
116613	Norcom	Dawson, Yukon	1908 St. Michael, Alaska	130 0	28 6	4 2	508	397	10 "	Canadian Yukon Navigation Co. Ltd., Dawson, Y.

List of Sailing Vessels and Barges Registered in Canada during July, 1913.

No.	Name	Port of Registry	Rig	When and Where Built	Length	Breadth	Depth	Reg. Tons	Owner or Managing Owner
137866	D. G. No. 8	Vancouver, B. C.	Scow	1913 Eburne, B. C.	39 0	14 5	4 0	33	Dewdney Gravel Co., Eburne, B.C.
133815	Elma No.	Lunenburg, N. S.	Schr.	1905 Tancook, N. S.	40 2	10 0	5 2	10	Macdonald, Stonehurst, N.S.
133668	F. C. Twohig	Halifax, N. S.	"	1910 Sambro, N. S.	40 0	10 5	5 4	10	A. Twohig, Pennant, N.S.
133971	Gilley No. 5	New Westminster, B. C.	Barge	1909 New Westminster	90 0	30 0	7 6	189	Gilley Bros., New Westminster, B.C.
133879	Granby No. 1	Vancouver, B. C.	"	1875 Bath, Me.	205 6	39 0	24 0	1294	Granby Consolidated Mining, Smelting and Power Co., Grand Forks, B.C.
133972	J. W. P. No. 4	New Westminster, B. C.	"	1913 New Westminster	94 3	32 0	8 0	213	J. W. Pike, New Westminster, B.C.
130436	Lyman M. Davis	Sarnia, Ont.	Schr.	1873 Muskegon, Mich.	123 0	27 2	9 0	198	J. Graham, et al, Kincardine, Ont.
133994	Marie Justine	Chatham, N. B.	"	1913 Caraquet, N. B.	44 0	14 7	5 9	22	J. A. Doiron, Caraquet, N.B.
133754	Mildred H. Cochran	St. John, N. B.	"	1874 East Haven, Conn.	117 0	32 7	8 8	245	W. B. Bentley, St. Martins, N.B.
133776	Oil Transport, No. 1	Victoria, B. C.	Barge	1913 Victoria, B. C.	90 0	32 0	8 4	201	Victoria Machinery Depot Co., Victoria B.C.
135862	P. S. B. & D. Co. No. 15	Vancouver, B. C.	Scow	1913 Seattle, Wash.	46 0	19 5	5 0	35	West Coast Bridge and Dredging Co., Vancouver
133870	P. S. Co. XXI	"	"	1913 New Westminster	53 5	18 2	4 0	35	Packers Steamship Co., Vancouver, B.C.
133871	P. S. Co. XXII	"	"	1913 " "	53 5	18 2	4 0	35	" " " "
133934	P. W. D. No. 123	Ottawa	Dredge	1913 Ottawa	90 0	35 0	7 8	404	Minister of Public Works, Ottawa
133864	Paget No. 11	Vancouver, B. C.	Scow	1903 Seattle, Wash.	82 2	24 0	8 0	127	West Coast Bridge and Dredging Co., Vancouver
130880	V. L. I.	New Westminster, B. C.	Barge	1913 New Westminster	88 0	30 0	8 2	187	V. Larson, New Westminster, B.C.

The New Welland Ship Canal Locks.

A description of the new Welland Ship Canal appeared in Canadian Railway and Marine World for July, in which the general canal scheme was outlined, and the general details discussed in comparison with the present and old canals. It will be recalled that the new canal will follow a course from Lake Ontario, where the entrance is 2¾ miles east of the present entrance at Port Dalhousie, through to Thorold, where the course of the new canal will be the same as that of the present one, with the exception of a couple of short stretches which have been changed for the reasons there explained.

The accompanying illustration shows lock 1, which is to be located directly on the shore of Lake Ontario, at the northerly end of the canal. This lock is typical of all the other single locks in all the essential particulars. The locking capacity of the canal will be 800

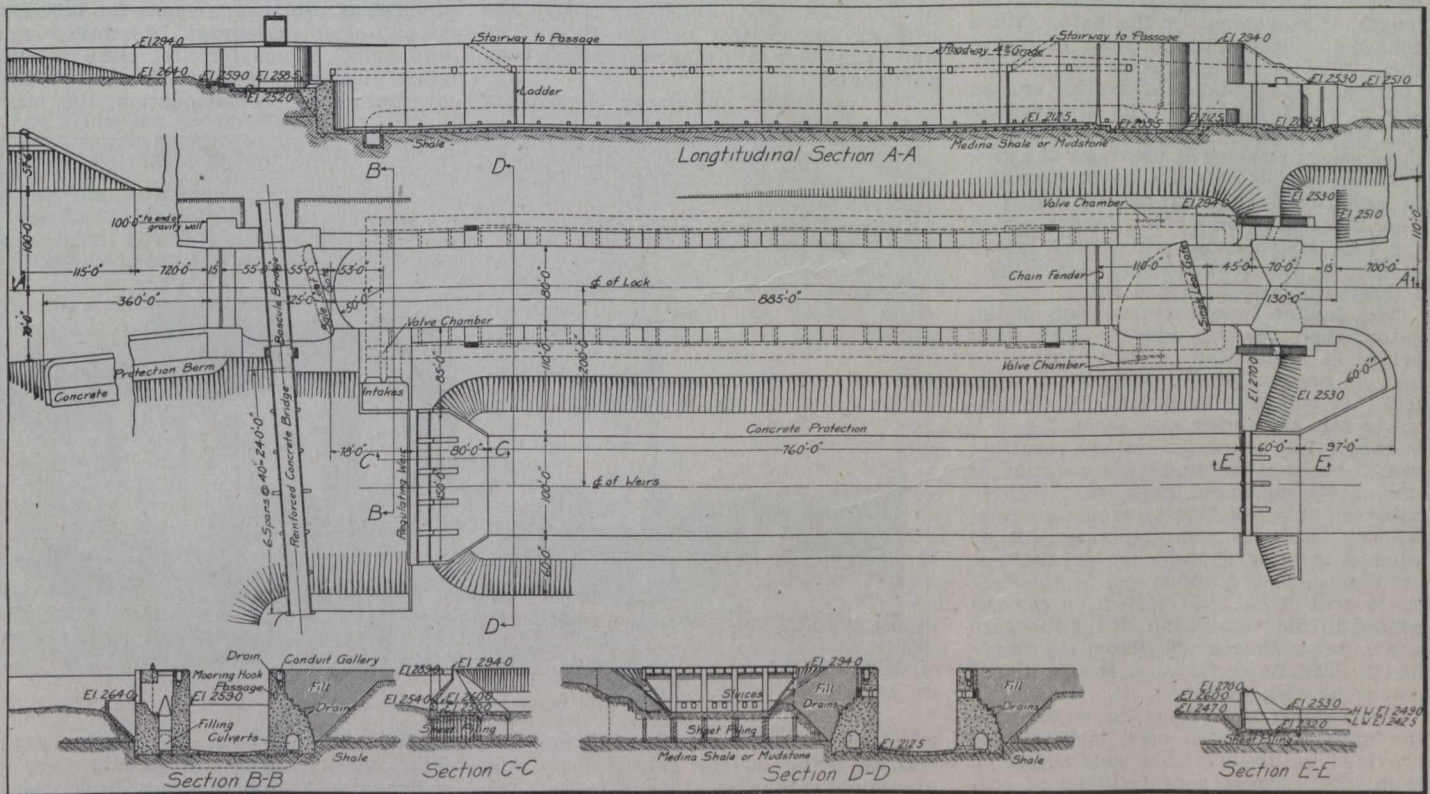
mass concrete throughout, built in sections of 60 ft., between each of which there will be an expansion joint, consisting of a dovetail of concrete extending the full depth of the walls, and in the centre of the dovetail there will be a strip of copper of Z section, connecting the two sections, and forming a water tight division, to prevent seepage of the water through the joint.

In the top of the side wall there will be a 5 by 9 ft. tunnel, the length of the lock. This tunnel will be floored so as to form a shallow chamber below for the electric cables, with the portion above the flooring for passing from end to end of the lock for the workmen. Below this combined tunnel there will be a 4 ft. square tunnel on each side of the lock, extending its full length, for drainage purposes.

With a floor level 30 ft. below the top of the lock walls, there is to be a 4 by

place it over the hook, and as the vessel rises, the line will be changed to the coping level. The usefulness of this passage is thus quite apparent. As the lock fills, the passage fills with water from the lock.

The filling and emptying of the locks have been carefully worked out, and it is expected that these operations will be carried out smoothly without the disturbance to the water in the upper reach of the canal as happens in locks of the usual design. Above each lock there is to be a considerable pondage area. Extending up the canal 360 ft., there will be a concrete berm, separating the channel of the canal from the main part of the pondage area, from which the water to fill the lock will be drawn through a valve chamber at the head of the lock from the side water, leaving the water in the channel undisturbed. At the bottom of the side walls of the lock there will be a 13 by 16 ft. horseshoe tunnel the length of the lock, with 3 ft. square openings leading from these two tun-



Typical Lock of the New Welland Ship Canal.

by 80 ft., with a draught of 30 ft., but to allow for the swing of the gates, the actual length of the lock between gate hinge pivots will be 885 ft., the length of the lock construction extending even beyond that, with a total length of 1,140 ft., not including approach wall. From the bottom of the lock to the top of the walls is a height of 84.5 ft. These dimensions give some idea of the stupendous character of the project.

The depth to which the canal structure is carried simplified the foundation problem, as the lower portion of the lock requires rock excavation, directly on which the lock is built. The rock on which locks 1, 2, 3 and 4 are founded is Medina Shale or Mudstone. Locks 5 and 6 are founded on sandstone, and lock 7 on gray shale. At locks 2 and 3 the lock excavations will not extend down to rock, but the side wall foundations will be carried down to that point, thus making the walls 100 ft. high.

The locks are to be constructed of

7 ft. tunnel extending the full length of the wall, with openings leading inward to the lock at every 100 ft., in which will be mooring hooks for berthing vessels passing through the lock. This tunnel is to be reached by stairways through the concrete near each end of each tunnel, from the surface above. The introduction of this tunnel is a novel feature of lock design, and should result in a considerable saving in locking time, by the expeditious manner in which the vessel can be secured in the lock. The lift of each of the locks is to be 46.5 ft., and the top of the lock wall will be 5 ft. above the water level when the lock is filled. A loaded vessel will have its deck possibly not more than 10 ft. above the water level when entering from below. Thus the deck will be upwards of 40 ft. below the top of the lock wall, which is too great a height to heave a rope. With the mooring hooks in the wall openings at every 100 ft., the rope can be thrown to an attendant, who will

nel into the lock at every 30 ft. This will feed the water into the tunnel uniformly through the 800 ft. length of the lock, balancing the pressure in the lock, disturbing the vessel in the lock a minimum amount. Connection from the valve chamber to the horseshoe tunnel on the side opposite to the valve chamber will be through a 13 by 15 ft. square tunnel of concrete, passing under the lock. The valves will be of the swing type, requiring a minimum time for opening. The emptying of the lock will be through the same side tunnels, which will lead through valve chambers, one on each side of the lock at the lower end, and out through the channel at the lower end.

A novel departure has been made in the gate design, which is of the single leaf type. It is customary to have them of the double leaf type, mitring at the centre, but a number of accidents have occurred with their use, through vessels from below striking one of the gates sufficiently hard to open it enough to al-

low the water pressure from above to swing down the other gate, allowing the water from the upper reach to fill the lock with a rush, causing damage. This difficulty has been minimized by the use of safety appliances which maintain the gates in an interlocked position even when bumped, but the danger still exists if a gate receives a sufficiently hard bump. With a single leaf gate, it is believed this trouble cannot be experienced, as even if the gate is opened slightly, the pressure will force it back to its seat.

The gate at the foot of the lock will be 83 ft. high and 88 ft. long, and will weigh in the neighborhood of 1,100 tons; the gate at the upper end will not be quite as deep. The gates will swing from a hinge set into one wall, and will swing across against a recess cut in the opposite wall. The gates will not swing into a position square across the lock, as it was found that by making only a slight increase in the length of the gate, the outer end might set 23 ft. forward of its square position, reducing the length of movement of the gate, with a consequent reduction in time of operation. The gates are to be electrically operated, the details of which are as yet to be developed. The tremendous size of the gates and the character of their construction will prove an effective stop for vessels that are beyond control. In addition to this protective construction, there is to be a chain fender across the lock above each gate, fitting into a recess in the lock walls. Below lock 1 there will also be guard gates.

The danger from vessels ramming the gates when passing into the lock from below is eliminated in this design of lock on account of the great lift in each lock. It will only be possible for a vessel to ram the upper gate when the lock is nearly full, when the danger resulting would be at a minimum on account of the nearly equalized pressures. Practically the only occasion on which a vessel will be liable to ram the gate will be when it is entering the lock. As the vessel enters, at the upper end of the lock there will be a wall 16.5 ft. high presented to the vessel, the sill of the gate above being that much above the lower level. The bump, if any, would be received by this wall.

The natural flow of surplus water from the upper reaches of each lock will be provided for by a double weir adjoining each lock. These weirs will be of concrete construction. To minimize the excavation work, the drop through the weirs is divided into two parts, the first of 29 ft., and the second of 17.5 ft. As the construction of the weirs will not involve considerable excavation, as just explained, a rock foundation for the weirs is not presented. In consequence, the weir will be built on a sheet piling foundation, spreading over a width of 80 ft. at the upper, and 65 ft. at the lower weir, to give the requisite bearing area.

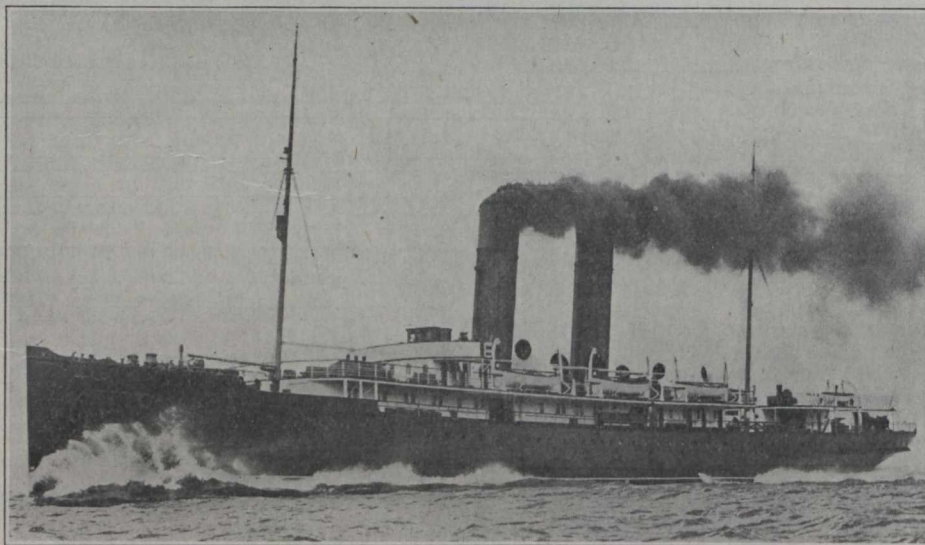
The surveys for the new canal were made under the direction of J. L. Weller, M. Can. Soc. C.E., Engineer in Charge, who also prepared the plans, etc., and to whom we are indebted for the data for this article.

The Western Steamship Co.'s s.s. Wexford, which went aground near Lime Island, Aug. 15, was released on the following Sunday. Some temporary repairs were undertaken which enabled her to proceed to Goderich to discharge her cargo.

Turbine Steamship for Canadian Pacific Railway Bay of Fundy Steamship Service.

In a previous issue of Canadian Railway and Marine World, it was announced that the C. P. R. had acquired, from the Great Western Ry. of England, the s.s. St. George, which it intends to operate between St. John, N. B., and Digby, N. S. The St. George has been operated for the past six years, between Rosslare, on the southwest coast of Ireland, and Fishguard, in South Wales, in conjunction with two other vessels of similar type, forming a connection between the Great Southern Ry. of Ireland, and the Great Western Ry. of England. She was built at Birkenhead, Eng., in 1906, and has the following principal dimensions: Length, between perpendiculars, 350 ft.; breadth of beam, 41 ft.; depth moulded to main deck, 17ft. 8 ins.; and to shelter deck, 25 ft. 11 ins. She is built of steel, and special attention was paid to the strength of the scantlings, which are above the average for vessels of this type. The hull is divided into nine watertight compartments.

The propelling machinery consists of



Canadian Pacific Railway s.s. St. George.

three sets of turbines, the high pressure turbine being on the centre shaft, and one combined low pressure and astern turbine on each of the wing shafts. The propeller shafting is of steel, turned all over and supported by plummer blocks, two to each length of shafting. The propellers are of the solid type, of manganese bronze, polished all over to reduce friction to a minimum. The condensers are placed alongside the after ends of the low pressure turbines, and are of steel plates with brass ends and doors, the cooling surfaces being composed of solid drawn brass tubes. Each condenser is connected to one of the low pressure turbines by a large rectangular steel eduction pipe, and the cooling water is supplied to the condensers by two large centrifugal circulating pumps, so arranged that either pump may supply either, or both, condensers. Pumps are also supplied for the forced lubrication of the bearings, and for water service purposes, and there is a full complement of bilge, sanitary and fresh water pumps. There are eight single ended, return tube boilers, suitable for a working pressure of 185 lbs. a sq. in. They are divided in two boiler rooms with a common stokehold to

each four boilers. The two funnels are elliptical in section, and are 75 ft. high above the level of the firbars. The boilers are worked under Howden's system of forced draught, and the air is supplied by four motor driven fans in a special fan room amidships. An electrical ash hoist and ash ejector are fitted in each boiler room. The thermo-tank-system of heating and ventilation is provided throughout the vessel, and a complete system of electric light, with two engines and dynamos, capable of developing 150 kilowatts, is also installed. The steam steering gear is placed on the main deck, and is of the latest type with single control valves and telemotor gear from the wheel house on the flying bridge and from the after bridge.

There are four decks, viz., boat, shelter, main and lower. On the boat deck are located the captain's room and chart house, the flying bridge and six lifeboats, the remainder of the space being utilized as a promenade for first class passengers. The shelter deck, which is divided as promenade space for first and second class passengers, has state rooms and public rooms for first class passengers. The main deck is chiefly occupied by first-class accommodation, the main

entrance being from the shelter deck. The general design and panelling are in polished teak, and the floor is laid with locked rubber tiling. The drawing room, about 50 by 21 ft. and 9 ft. high, is decorated with West India satinwood panels and framing with inlaid bordering, and the ceiling is in panels of lincrusta, painted and decorated. The furniture is of dark mahogany, and the floor of parquet. At the forward end of the room there is a large electric heater enclosed in a brass grille. The smoking room is panelled in oak with fumed oak framing, and the floor is of parquet. The dining saloon is forward, and has accommodation for 90 passengers arranged at small tables. The decorations are in Hungarian ash and satinwood. The couch seats round the dining saloon are so arranged that in case of necessity, they may be converted into berths. The state room accommodation consists of 47 rooms on the shelter, main and lower decks, providing berths for 150 passengers, in two and four berth apartments. The total number of berths for first class passengers is 210, including those in the dining saloon and ladies' rooms. The ladies' retiring room is on the main deck

adjacent to the dining saloon, and on the lower deck there are two large rooms for ladies and children.

Second class accommodation is provided at the after end of the vessel, and is divided into dining rooms, ladies' rooms and sleeping apartment, with promenade space on the shelter deck. There are two dining rooms, one being for ladies, providing accommodation for 58 passengers. The sleeping apartment on the lower deck is a large room with berths for 28 passengers, the upper berths folding down to form the backs of couches during the day.

On account of the comparatively short trips for which this vessel was built, and for which she will be utilized on this side, the bunker space is small, and it was therefore necessary to arrange that she be towed across the Atlantic. The tug ran short of fuel, owing to rough weather, and was compelled to leave the vessel off Newfoundland and put in at St. John's, July 27, for coal. The Reeid Newfoundland Co.'s s.s. Kyle, and the tug Blackcock, eventually picked her up, and the journey to Halifax was completed in safety.

The Dominion Government Dry Dock at Lauzon, Quebec.

As mentioned in previous issues of Canadian Railway and Marine World, the Dominion Government has decided that the construction of a dry dock in the Port of Quebec shall be undertaken as a Government work, and has awarded the contract to M. P. and J. T. Davis. The site, which has been acquired by the Government, is located opposite the city of Quebec on the south shore of the St. Lawrence, in Lauzon Village, two miles east of Levis, and close to the existing Government dry dock.

The dock will be of the following dimensions:—length from caisson stop to head wall, 1,150 ft.; width of entrance, 120 ft.; depth on sill at ordinary high water spring tides, 40 ft.; it will be divided in two parts, 650 and 500 ft. respectively. The outer entrance will be closed by a steel rolling caisson, and a ship, or floating caisson will close the inner entrance. The ship caisson will also fit the outer face of the outer sill, so as to facilitate repairs to the rolling caisson, when required. The dock will be emptied by three centrifugal pumps, each having a capacity of 60,000 galls. a minute, operated by electric motors, supplied with current by generators revolved by three steam turbines, steam being furnished by eight water tube boilers, capable of supplying 3,600 h.p. The rolling caisson will also be operated by electric motor.

The general construction work will include the construction of a cofferdam to surround the whole of the entrance walls of the dock, furnished with the necessary pumping machinery to keep the enclosed area dry; the excavation in earth and rock over the area to be occupied by the dock, including all drains, pump wells and sumps; the construction of concrete walls with altars, stairs, floor, manholes, culverts, pump chamber walls and caisson chamber; the building of granite copings, caisson stops, facings to culvert outlets and inlets, facings to timber slide entrance, etc.; the construction and placing of the steel rolling caisson with rollers and one steel floating caisson, complete with pumps, electric motors, valves, etc.; the construction and furnishing of the pump house, with three pumps, each of 60,000 galls. a minute capacity, power house with eight steam boilers

with mechanical stokers, coal crusher, coal and ash conveyors, three steam turbines and four electric generators; the supply of keel blocks and bilge blocks with chains and tackle, and all requisite bollards and capstans; the furnishing of all materials, and the building of a brick chimney 180 ft. high, two entrance piers 600 ft. long, 75 ft. wide, in 30 ft. of water at low tide, the dredging of a specified area to a depth of 30 ft. at low tide, and the installation of underground electric wiring and of electric light wiring in the buildings.

The Descriptive Declarations of Cargoes at Montreal.

The Shipping Federation of Canada sent a deputation consisting of A. A. Allan, Jas. Thom and Thos. Robb to Ottawa recently, to protest to the Government against the enforcement of a by-law of the Montreal Harbor Commissioners, which provides as follows:—"The agent of every vessel arriving in harbor, the cargo of which is subject to wharfage rates, shall within four days after the arrival of the vessel, deposit in the office of the Harbor Commissioners one certified copy of the manifest of said vessel, giving the names of the consignees, full description of the goods and the weight or measurement thereof, according as the goods were carried by water, by ton weight or ton measurement."

The deputation was received by the acting Minister of Marine, who heard the objections, which covered the following points:—The bylaw was passed by the last Commissioners, who, after hearing objections to it voiced by the Shipping Federation of Canada, did not enforce it, and the Federation has taken up the matter with the present Commissioners on several occasions, but they do not seem inclined to rescind the bylaw. The deputation are of opinion that as the information is for statistical, and not for revenue purposes, it should be obtained by the Commissioners' staff. The respective shipping companies have made attempts to carry out the provisions of the bylaw, but find it impossible to do so, as they have no means of obtaining the information other than from the bills of lading. They also think that the in-

formation desired could more easily be obtained by the Commissioners' clerk, at the Customs House, when the wharfage charges are paid, as the bills of lading are then produced. It was also pointed out that such information was not required at any U.S. port, and it was suggested that when any new rules are proposed the Commissioners should take the shippers into consultation, thus leading to better results than could be produced by argument after such had become law.

The Furness Line's Steamship Digby.

The steamship Digby, which has recently been placed in service between Liverpool, Eng., St. John's, Nfld., and Halifax, N.S., has been specially built for the passenger, fruit and general cargo trade, and should the business warrant it, other vessels of a similar type will be added to the fleet as required. She was built at West Hartlepool, Eng., and has the following chief dimensions:—length over all 365 ft., length between perpendiculars 350 ft., breadth, extreme, 50 ft., depth moulded to upper deck 25½ ft., depth moulded to shelter deck 34 ft. 1 in. She is classed 100 A1 shelter deck class, and is equipped to fulfil the requirements of the British Board of Trade, with a full passenger certificate. The hull is divided into watertight compartments by six transverse watertight bulkheads, and the forward part is strengthened for ice service. A special system of mechanical ventilation is provided to the holds and 'tween decks for the proper preservation of fruit and similar cargo. The passenger accommodation, for 58 first class, and 32 second class, is arranged, the former, amidships, and the latter aft. Complete installations of electric light equipment and refrigerating machinery are supplied. The propelling machinery consists of triple expansion engines with cylinders 28, 46 and 77 ins. diam. by 48 ins. stroke, supplied with steam by four single ended boilers 16½ by 12 ft., at 180 lbs. pressure under Howden's forced draught.

THE GOLDSCHMIDT THERMIT CO. announces that its San Francisco office has been changed from 432-436 Folsom Street, to 329-333 Folsom Street.

Sault Ste. Marie Canals Traffic.

The following commerce passed through the Sault Ste. Marie Canals during July, 1913.

ARTICLES	CANADIAN CANAL	U. S. CANAL	TOTAL
Copper..... Eastbound..... Short tons	1,148	12,287	13,435
Grain..... "..... Bushels	5,020,743	8,184,899	13,205,642
Building stone..... "..... Short tons	5,700		5,700
Flour..... "..... Barrels	340,010	866,450	1,206,460
Iron ore..... "..... Short tons	5,499,705	2,567,295	8,067,000
Pig iron..... "..... ".....		6,369	6,369
Lumber..... "..... M. ft. b.m.	1,787	86,229	88,016
Silver ore..... "..... Short tons			
Wheat..... "..... Bushels	7,934,066	3,753,077	11,687,143
General merchandise..... "..... Short tons	32,831	58,350	91,181
Passengers..... "..... Number	4,079	7,503	11,582
Coal, hard..... Westbound..... Short tons	87,010	334,516	421,526
Coal, soft..... "..... ".....	523,410	1,971,380	2,494,790
Flour..... "..... Barrels	200		200
Grain..... "..... Bushels		400	400
Manufactured iron..... "..... Short tons	12,892	34,306	47,198
Iron ore..... "..... ".....	6,048		6,048
Salt..... "..... Barrels	7,665	62,192	69,857
General merchandise..... "..... Short tons	36,028	104,515	140,543
Passengers..... "..... Number	7,174	5,611	12,785
Summary.			
Vessel passages..... Number	1,357	2,313	3,670
Registered tonnage..... Net	3,944,460	4,752,542	8,697,002
Freight—Eastbound..... Short tons	5,930,569	3,168,000	9,107,569
—Westbound..... ".....	716,508	2,454,052	3,170,555
Total freight..... ".....	6,656,072	5,622,052	12,278,124

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 distinctly to 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 NORTHEY-SIMMEN SIGNAL CO., Toronto and Indianapolis, has issued an illustrated booklet describing its dispatching and signalling system.

THE GALENA SIGNAL OIL CO. has appointed J. C. Tipton as Canadian representative, with office at 603 Shaughnessy Building, Montreal, to succeed the late A. Lichtenhein.

THE HALL SWITCH & SIGNAL CO. has opened a sales office in the New Birks Building, Montreal, with B. H. Richards, Sales Engineer, in charge, to handle its Canadian business.

THE AMERICAN LOCOMOTIVE CO. has issued bulletin 1014, "Most Powerful Locomotive in the World," describing and illustrating a Mallet with 115,000 lbs. tractive power working compound, built for the Virginia Ry.

THE NICHOLSON FILE CO., Port Hope, Ont., has issued the 8th edition of "File Filosophy," which contains valuable matter on practical filing. Superintendents, foremen, supervisors of apprentices, master mechanics, and others who are interested in the best and quickest methods of filing, motions, methods of holding the file and handling the work, will find them clearly explained. A copy will be sent to any applicant, free.

THE BROWN HOISTING MACHINERY CO., Cleveland, Ohio, has issued "Brown Hoist Locomotive Cranes, Catalogue 1," giving a general description of its locomotive cranes, portal pier cranes, traction cranes and work car cranes, a profusion of illustrations showing how the cranes are used by railways, contractors, manufacturers, lumbermen, shippers, dealers, etc. Among the illustrations is one of a 5 ton electric work car crane in use by the Toronto Railway, and one of a 15 ton locomotive crane handling structural material for McGregor and McIntyre, Ltd., Toronto.

THE AMERICAN VANADIUM CO. announces that vanadium cast steel frames are specified on 75 mikado type locomotives recently ordered by the G.T.R., of which 50 will be built by the Montreal Locomotive Works, and 25 by the Baldwin Locomotive Works. Heat treated chrome vanadium steel wheels have also been specified for the tenders of the 50 locomotives being built by the first mentioned company. These tenders will have a water capacity of 9,000 gallons and 15 tons coal capacity. With full load of coal and water they will weigh approximately 172,000 lbs., giving an average load of 21,500 lbs. per wheel on the rail.

THE GENERAL RAILWAY SIGNAL CO., Rochester, N.Y., has issued an Electric Interlocking Handbook, a treatise on its dynamic indication electric interlocking, alternating and direct current apparatus used in connection therewith, containing circuits and illustrations describing their application. It also contains data on the installation, operation and maintenance of electric interlocking and has much data for use of the signal

engineer and those who are in any way connected with railway signaling. Its free distribution is limited to railway officials and those connected with the installation, operation and maintenance of signals. To others the price is \$3.

Transportation Associations, Clubs, Etc.

The names of persons given below are those of the secretaries.

Canadian Car Service Bureau. J. Reilly (acting), 401 St. Nicholas Building, Montreal.

Canadian Electric Railway Association, Acton Burrows, 70 Bond Street, Toronto.

Canadian Freight Association (Eastern Lines), G. C. Ransom, Canadian Express Building, Montreal.

Canadian Freight Association (Western Lines), W. E. Campbell, 502 Canada Building, Winnipeg.

Canadian Railway Club, J. Powell, St. Lambert, Que. Meetings at Montreal, 2nd Tuesday each month, 8.30 p.m., except June, July and August.

Canadian Society of Civil Engineers, C. H. McLeod, 176 Mansfield St. West, Montreal.

Canadian Ticket Agents' Association, E. de la Hooke, London, Ont.

Central Railway and Engineering Club of Canada, C. L. Worth, 409 Union Station, Toronto. Meetings at Toronto 3rd Tuesday each month, except June, July and August.

Dominion Marine Association, Counsel, F. King, Kingston, Ont.

Eastern Canadian Passenger Association, G. H. Webster, 54 Beaver Hall Hill, Montreal.

Engineers' Club of Montreal, R. W. H. Smith, 9 Beaver Hall Square, Montreal.

Engineers' Club of Toronto, R. B. Wolsey, 94 King St. West, Toronto.

Great Lakes and St. Lawrence River Rate Committee, Jas. Morrison, Montreal.

International Water Lines Passenger Association, M. R. Nelson, New York.

Niagara Frontier Summer Rate Committee, Jas. Morrison, Montreal.

Nova Scotia Society of Engineers, A. R. McCleave, Halifax, N.S.

Quebec Transportation Club, J. S. Blanchet, Quebec.

Ship Masters' Association of Canada, H. O. Jackson, 376 Huron St., Toronto.

Shipping Federation of Canada, T. Robb, 526 Board of Trade, Montreal.

Western Canada Railway Club, W. H. Rose-year, 25½ Princess St., Winnipeg. Meetings at Winnipeg 2nd and Monday each month, except June, July and August.

Transportation Conventions in 1913.

Sept. 1-14.—American Boiler Manufacturers' Association, Cleveland, O.

Sept. 8-12.—Roadmasters' and Maintenance of Way Association, Chicago, Ill.

Sept. 9-12.—Master Car and Locomotive Painters' Association of U.S. and Canada, Ottawa, Ont.

Sept. 25.—Eastern Association of Car Service Officers, New York.

Oct. 8.—Association of Water Line Accounting Officers, Philadelphia, Pa.

Oct. 14.—Railway Signal Association, Nashville, Tenn.

Oct. 14, 15.—American Association of General Passenger and Ticket Agents, Philadelphia, Pa.

Oct. 14-17.—Railway Signal Association, Nashville, Tenn.

Oct. 15-17.—American Association of Railway Surgeons, Chicago, Ill.

Oct. 18-24.—Association of Railway Electrical Engineers, Chicago, Ill.

Oct. 21-24.—American Railway Bridge and Building Association, Montreal.

Oct. 23-25.—American Association of Dining Car Superintendents, Buffalo, N.Y.

Nov. 19.—American Railway Association, Chicago, Ill.

During June there were 9 fatal and 7 non fatal accidents to employees in the course of their work in connection with the navigation of Dominion vessels. Of the fatalities, 3 were due to the sinking of a schooner in a gale, 4 to falling into holds of vessels, and one each to falling overboard and to the collapse of a freight shed.



INTERCOLONIAL RAILWAY

TENDER

SEALED TENDERS, addressed to the undersigned, and marked on the outside "Tender, Double Tracking Line Between St. Romuald and Chaudiere Curve," will be received up to and including Monday, September 8th, for double tracking the line between St. Romuald and Chaudiere Curve, P. Q.

Plans and Specifications may be seen at the Station Master's Office, Levis, P. Q., at the Chief Engineer's Office, Moncton, N.B., and at the office of the Assistant Deputy Minister and Secretary, Department of Railways and Canals, Ottawa, Ont., at which places forms of tender may be obtained.

All the conditions of the specifications must be complied with.

L. K. JONES,

Asst. Deputy Minister and Secretary,
Dept. of Railways and Canals.

Ottawa, Ont., Aug. 14th, 1913.

Canadian Pacific Railway Company

NOTICE TO SHAREHOLDERS

The Thirty-second Annual General Meeting of the Shareholders of this Company for the election of Directors to take the places of the retiring Directors, and for the transaction of business generally, will be held on Wednesday, the first day of October next, at the principal office of the Company, at Montreal, at Twelve o'clock noon.


The Common Stock Transfer Books will be closed in Montreal, New York and London at 1 p.m., on Saturday, the thirtieth day of August. The Preference Stock Books will be closed in London at the same time.

All books will be re-opened on Thursday, the second day of October.

By order of the Board,

W. R. BAKER, Secretary.

Montreal, August 11th, 1913.



Quality Not Quantity

Is the reason why we make our Replacers out of the BEST STEEL PLATE instead of cast metal. The distance from caboose to head end of train is getting longer, and when a man carries a pair of our Replacers that distance he is not all used up, but ready to rerail his car or locomotive.

The pair this man is carrying is our Standard No. 1, made of 9-16 plate, weight 164 lbs. per pair, and guaranteed to carry 200 tons.

We make smaller sizes, No. 3 for Mine Work, Electric Motors, Mine Engines and Rope Haulage; weight 58 lbs. per pair.

Do not fool yourself. If you want efficiency and quick service give your men a tool they can handle, that will do the work and that pleases them.

SEND FOR CIRCULAR SHOWING USERS. 70,000 PAIR IN SERVICE.

The Alexander Car Replacer Manufacturing Co.
SCRANTON, PA.