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THE

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The Columbia & Western Railway.

The extension of this line from West Robson to Midway, B.C., was inspected on behalf of the B.C. Government by H. B. Smith, M. Inst. C.E., whose reports, which have only just been made public, contain a lot of interesting information about the line. The first report deals with the first section of the line between West Robson & Grand Forks, & it must be borne in mind that it was dated Sep. 29. 1899, when the line was uncompleted & that since that date it has been finished & opened for traffic. Following are extracts:

The West Robson-Grand Forks division of the C. & W. Ry. is an extension westward of the Trail-West Robson division of the same railway. It commences at West Robson, 1,400 ft. above sea level on the south bank of the Columbia River, directly opposite the Columbia & Kootenay Ry. terminus at Robson. From thence it extends westerly along the banks of the Columbia River & Arrow Lake to Brooklyn, 2,750 ft. above sea level, 13 miles from West Robson. From Brooklyn it follows a southerly and westerly course to 22 miles distant from West Robson. Here a tunnel 43,00 ft. long & 3,180 ft. above sea level has been found necessary to reach the valley of Dog Creek. From this tunnel the course is southerly to McRae Creek Pass, 3,990 ft. above sea level, & 30¼ miles from West Robson. From McRae Creek Pass the course is southerly & westerly along the valley of McRae Creek to the valley of Christina Lake, 47 miles from Robson. It then follows southerly the valleys of Christina Lake & Christina Creek to Cascade City, 1,650 ft. above sea level, & 54 miles from West Robson. From Cascade City the course is nearly due west along the valley of Kettle River to Grand Forks, 1,700 ft. above sea level, & 67 miles from West Robson. Up to 5 miles from West Robson the railway passes over extensive flats; it then winds along irregular & precipitous & rocky side-hills to Cascade City, where the beautiful & uniform valley of Kettle River is reached, which it follows for 13 miles to Grand Forks. The railway, therefore, passes over 18½ miles of flats, & 482 miles of side-hill.

The location of the railway, from an economical point of view, has been unusually skilfully made, & leaves little room for improvement without heavy additional expenditure.

JAMES DUNSMUIR,

Vice-President of the Esquimalt & Nanaimo Railway & Premier of British Columbia.

The general course is as direct as the rugged nature of the country would permit. Every flat affording suitable grades & alignment has been taken advantage of, & on the side-hills the curvature fits the natural irregularities of the ground with great precision. This has necessitated many long & very high timber trestles, several of which could be dispensed with, but only at considerable outlay. The long tunnel, 22 miles from West Robson, at the head of Bull Dog Creek, has been found necessary in order to avoid the circuitous & much more costly route via Arrow Lake & Dog Creek. In Kettle River valley, the Kettle River is crossed four times. There appear to be no means by which any one of these crossings could be advantageously avoided.

The railway is of standard gauge, 4 ft. 8½ ins. from inside to inside of rail head, except on curves exceeding 4 degrees. The additional width or spread for sharper curves is as follows:—

4 degrees	to	6 degrees	½	of an	inch
6 "		8 "	¼	"	
8 "		10 "	3/8	"	
10 "		14 "	½	"	

The general curvature is light for a mountain railway. Curves vary from 20 minutes to 14 degrees, or from 17,189 to 410 ft. radius, & cover 32,884 miles of the total length. The combined length of tangent is 34,058 miles. The total curvature is, therefore, 49.12% of the total mileage. The curve of most frequent occurrence is 14 degrees. The total number of curves is 563, made up as follows:

Degree.	No.	Length.	% of Whole.
0 20 to 1	11	4,088.5	1.16
1 " 2	45	20,427.0	5.78
2 " 3	44	15,131.0	4.28
3 " 4	54	20,902.2	5.91
4 " 5	55	16,722.2	4.73
5 " 6	42	13,218.7	3.74
6 " 7	49	12,269.7	3.47
7 " 8	26	7,906.4	2.24
8 " 9	31	6,382.0	1.80
9 " 10	13	2,518.1	0.71
10 " 11	57	14,211.7	4.02
11 " 12	13	3,457.3	0.98
12 " 13	39	10,273.7	2.91
13 " 14	4	1,043.9	0.30
14	80	25,076.5	7.09
Totals	563	173,629.7	49.12

The longest curve is 1 degree & 30 minutes, 2173.3 ft. in length. The longest tangent is 5814.6 ft. in length.

From West Robson to mile 5.4 grades undulate & in no case exceed 0.75 per 100. At mile 5.4 an uniform 2.2 per 100 upward grade, compensated for curvature, begins & continues to the long tunnel at mile 21.9. The grade through the long tunnel rises 1.1 per 100 to mile 22.5. At mile 22.5 an uniform 2.2 per 100 upward grade, compensated for curvature, & broken by a small portion of level grade at mile 24.6, continues to McRae

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Creek summit at mile 30.2. This is the highest elevation attained by the railway. From mile 30.2 to mile 30.4 is level. At mile 30.4 a continuous downward grade to the Kettle River commences. From 30.4 to 32.6 the maximum downward grade, compensated for curvature, is 1.8 per 100. From 32.6 to Kettle River at mile 53.2, the downward grade, compensated for curvature, is uniformly 2.2 per 100. From mile 53.2 to mile 53.6 the grade rises at the rate of 0.26 per 100. From mile 53.6 to Cascade City at mile 55, the grade, compensated for curvature, rises uniformly at the rate of 2.2 per 100. From mile 55 to mile 59.3 grades undulate, the maximum being 0.5 per 100. From mile 59.3 to Grand Forks at mile 67.2, grades undulate, the maximum being 1.5 per 100. All grades over 1.5 per 100 are compensated for curvature at the rate of 4 one-hundredths of a foot in each 100 ft. for each degree of curvature, that is to say, that in a 14-degree curve, having a tangential grade of 2.2 per 100, the grade on the curve is reduced 56 one-hundredths of a foot, which subtracted from the original grade of 2.2 per 100, leaves 1.66 per 100 as the compensated grade on the curve. The total rise of the railway from West Robson to McRae Creek summit is 2,590 ft., the total fall from McRae Creek summit to Kettle River is 2,440 ft., & the total rise from Kettle River to Grand Forks is 136 ft.

All embankments at formation level are 14 ft. in width, with side slopes of 1½ to 1 in earth, sand & gravel, & 1 to 1 in loose rock. On side-hill these slopes reach the flats below in most cases. In a few instances, however, the vertical nature of the side-hill has rendered it necessary to retain embankments by crib-work or dry stone walls. The toes of all embankments are well above the high-water mark of the waters adjacent to them, except at miles 56 & 57, where well-executed rip-rap has been added as a protection.

All excavations are 18 ft. wide at formation level with side slopes in earth & sand of 1 to 1, & in rock of ¼ to 1. In hard-pan cuts the slopes have been executed to suit the stability of the material. All excavations have been excellently made & present a thoroughly finished appearance, except where ballasting material has been borrowed.

There are two places only at which timber crib-work has been erected for the purpose of retaining embankments. The rock in the immediate vicinity is decayed, & this is the reason given for their construction. They occur at mile 47 & are of excellent design. They are each 60 ft. long & from 12 to 15 ft. high. The plan of these structures shows inside & outside batter of walls to be ¼ to 1. Each crib is 7 by 7 ft. inside horizontal measurement, & consists of 12 in. round logs dovetailed & box-jointed, & secured with tree-nails 2 in. diam. & 20 ins. long, & with wrought iron drift-bolts ¾ in. diam. & 22 ins. long. Each drift-bolt penetrates through one log & at least 6 ins. into the log below.

Rock slopes occur on the steep side-hills of Arrow Lake, Bull-Dog Creek, McRae Creek, & Christina Lake. There are 29 in all, varying from 30 to 270 ft. in length, & from 10 to 40 ft. in height. Combined they cover a total length of 2,640 ft. The rear wall is vertical, & the front wall batters at the rate of 1 in 3. The top of the wall is 3 ft. wide. The filling behind the wall is broken rock. In all cases the foundations are on solid rock. The stones comprising the walls are of large size & are roughly shaped into rectangular blocks; a very solid & permanent dry rock wall has thus been obtained.

Excellent provision for the passage of streams & surface drainage across the track has been made by means of log culverts, ballast boxes, rock & log drains. The total number of log culverts is 156. They are of the usual log culvert pattern, having solid cedar or fir walls & covering, secured by tree-nails & drift-bolts, the whole resting on round sills in pairs from 5 to 8 ft. apart, the spaces between the sills being filled flush with broken rock. The workmanship on these structures is excellent. Rock drains, log drains, & ballast boxes are of the usual design.

The road-bed from West Robson to Grand Forks has been three-quarters ballasted with material either hauled considerable distances or borrowed from the faces of adjacent excavations & embankments. For a new railway the ballasting so far done is very much superior to, & greatly in excess of, that usually found. Much more, however, will require to be done to place the road-bed in standard condition. The hauled ballast is excellent, being either coarse gravel or broken rock, but the greater portion of that obtained from slope faces is not ballast but merely earth filling.

There are five tunnels. All have been carefully pierced, & present unusually uniform surfaces. The design & specified dimensions have been closely adhered to, & are as follows: width at formation level & at spring of roof, 16 ft.; clear centre height above formation level, 23 ft. 2¼ ins.; & above rail level, 21 ft. 6 ins., ballast being 9 ins. deep. The nature of the rock through which the tunnels pass is granitic, & is of such solidity that but little timbering, 200 ft. in all, has been required. On curves from 8 to 14 degrees, the centre lines of the tunnels have been placed 7 ins. off the centre line of the road-bed; on 6 degree curves, 5 ins.; & on 4 degree curves, 3 ins. Following is a list of tunnels:

Mile	5½,	194 ft.	from portal to portal.
"	12	187 "	"
"	15	291 "	"
"	22	3,004 "	"
"	36	329 "	"

Combined these tunnels cover a total distance of 4,004 ft.

No safety switchbacks have as yet been constructed. In a railway having so many miles of grades exceeding 2 per 100, safety switchbacks are a necessity & should be built without delay. Owing to the length of time required to construct the long tunnel at mile 22, & the desire of the railway company to open the railway for traffic, a temporary switchback was constructed over the mountain at that point. It consisted of 10 switches, 5 on the east slope & 5 on the west slope. The total rise from the east portal of the tunnel was 507 ft., & from the west portal 403 ft. The grade both ascending & descending was uniformly 4 per 100, & curves varied up to 22 degrees. The total length of the switchback from main line to main line was 5.12 miles, & the time occupied in traversing it by trains was one hour. The steep grade, & the temporary character of the work, necessitated extreme care on the part of the officials operating it.

From West Robson to mile 5.4 & from mile 50.5 to mile 67 at Grand Forks there are no trestles. Between miles 5.4 & 50.5 trestles have been constructed to a most unusual extent. The location of the line in this respect has been made with an undue regard to economy, & should the railway become a trunk line many of these structures must be eliminated. Every trestle is an element of danger, & the only excuse in the present instance is the immense cost of obtaining a more solid road-bed by throwing the alignment further into the side hill. There are in all 49 timber trestles, covering a distance of 13,140 ft. or 5½

% of the total distance between miles 5.4 & 50.5.

The following is a list of all trestles :

No. of bents.	No. of trestles.	Total length, ft.	Greatest central height, ft.	Average centre height, ft.
5 to 9	9	1215	36	26
10 " 14	15	2895	66	35
15 " 19	10	2700	83	57
20 " 24	5	1620	92	58
25 " 29	6	2475	120	58
30 " 34	2	975	128	126
35 " 39	1	555	90	90
40 " 44	nil			
45 " 49	1	705	170	170
Totals	49	13,140		

In the design & construction of these trestles, strength, rigidity & durability have been objects sought for & obtained. They are excellent structures in every detail. Most of the trestles are built over rocky gulches, & in these cases the best possible foundations were obtained, namely, mud-sills resting on solid rock. In earth & soft material it was found, in some cases, advantageous to use piles 10 ins. in diameter at the small end, & 14 ins. at the large end. These were driven with a 2,000 lbs. hammer, having a free fall of 20 ft. for the end blow, the maximum penetration under the last 5 blows not exceeding 5 ins. Pile foundations are used for 10 trestles, one pile under each post. In the substructures all bents are 15 ft. apart, centre to centre. Caps are 12 by 12 ins. by 14 ft., & are secured to posts by ¾ in. drift-bolts 21 ins. long. In single deck trestles there are 2 vertical posts & 2 raking posts, each 12 by 12 ins. Sway braces & wales are 3 by 10 ins., & are bolted at the ends through posts ¾ by 18½ in. screw bolts, & spiked to intermediate posts, ½ by 7 in. boat spikes. Longitudinals 8 by 10 ins. are placed above wales & sills & are screwed at the ends by ¾ in. screw bolts, 21½ ins. long. In double-decked trestles the same design & scantling of timber are retained. The sill of the upper deck is separated from the cap of the lower deck by 8 longitudinals 8 by 12 ins. Connecting the lower half of each deck are 4 longitudinal diagonal braces 6 by 10 inches. In 3 deck trestles & upwards the same design & dimensions are retained. The number of posts is increased as follows :

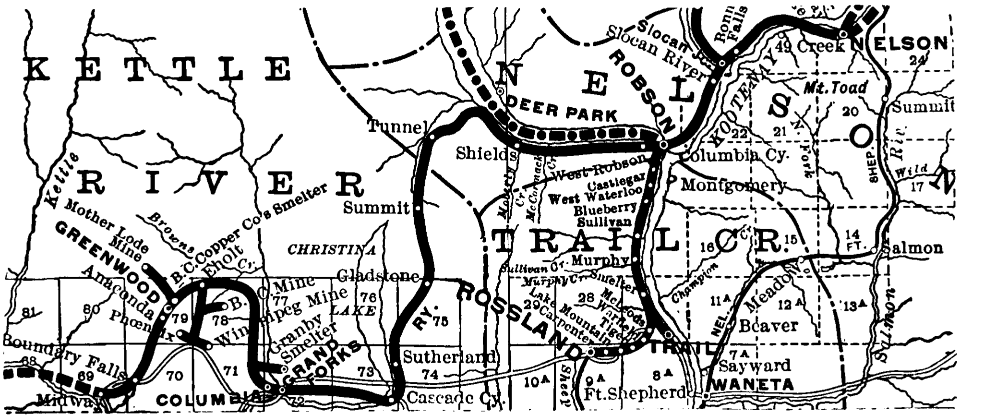
Upper deck,	2 uprights and	2	raking posts.	
Second	"	"	" 4	"
Third	"	"	" 4	"
Fourth	"	"	" 6	"
Fifth	"	"	" 6	"
Sixth	"	"	" 8	"

External raking posts batter at the rate of 3 ins. to 1 ft., internal raking posts at the rate of 2½ ins. to 1 ft.

There is one exception to the style & dimensions mentioned above. This occurs at mile 27, & is known as Porcupine Trestle. It is stated that timbers of the required length could not be obtained within a reasonable distance. The posts were, therefore, reduced from 30 ft. in length to 18 ft., thus rendering 10 decks necessary. This structure is not as finished in appearance as its neighbors. The posts in the various decks are, upper & second decks, 4; 3rd, 4th, 5th & 6th decks, 7; 8th, 9th & 10th decks, 8. Longitudinals & diagonals, 8 by 10 ins., connect each bent. In one important feature this trestle differs from all others. The customary cap & sill between decks has been dispensed with, & a single timber substituted. It is claimed by the officials that the reduction in weight thus obtained is an advantage, & a strong & rigid trestle has been obtained. Whether this is the case or not can only be determined by a careful investigation of the forces affecting the structure. The change effected is an innovation & contrary to usual practice. In appearance the structure is stable, but no opinion can be passed without calculations, & for that purpose a detail plan is necessary.

The trestle superstructures are unusually strong. There are 8 stringers of Douglas fir, 30 ft. by 8 ins. by 16 ins., breaking joint, & bolted together by ¾-inch screw bolts, 25½ ins. long. Ties are 8 ins. by 8 ins. by 12 ft., spaced 4 ins. apart & spiked to stringers by boat spikes, ½-in. by 12 ins. Guard rails are double. The outside rail is 8 by 8 ins., bolted to every fourth tie by ¾-in. screw bolts, 18½ ins. long. The inside rail is parallel to the outside rail, except for 20 ft. at the ends, where it flares outwards to a junction with the outside rail. It is secured to the ties at intervals of 3 ft. by means of lag screws, ⅝ by 8 in. On curves the superstructure is canted to the required elevation by increasing the length of the outside posts of the superstructure. All washers are of cast-iron, ⅞-inch by 3 ins. by 1½ ins.

Timber Howe truss bridges have been constructed, or are in course of construction, at the following points :



THE COLUMBIA AND WESTERN RAILWAY.

Mile 8½, McCormack Creek.—This is a Howe truss deck span of 150 ft., supported on frame timber abutments, consisting of 24, 12 by 12 ins. posts resting on solid rock. Rail level is about 190 ft. above the creek. The approaches consist of 21 trestle bents. The total distance covered by the bridge & its approaches is 490 ft.

Mile 11, Moberley Creek.—This also is a Howe truss deck span of 150 ft. supported on frame timber abutments, consisting of 24, 12 by 12 ins. posts resting on solid rock. Rail level is about 160 ft. above the creek. The approaches consist of 32 trestle bents. The total distance covered by the bridge & its approaches is 660 ft.

Mile 41½.—A timber trestle about 100 feet long was originally constructed. A small snow-slide, however, occurred & swept away the central bents. It is now proposed to erect a small through truss in place of the trestle, & false-work for this purpose has been placed in position.

Mile 53½, Kettle River, 1st crossing.—At this point it is proposed to construct 2 Howe truss deck spans, each 150 ft., supported on frame timber abutments & pier, each abutment having 24 posts & the pier 28 posts. All posts will be supported on piles driven until a 2,500 lb. hammer, with a fall of 25 ft., will cause 1 in. only of penetration. Piles will be enclosed in rock-filled caissons. The approaches are trestle bents, & are already constructed. The east approach consists of 62 bents, & the west of 19 bents. Rail level is about 80 ft. above water level, & the whole structure covers a distance of 1,570 ft.

Mile 55, Kettle River, 2nd crossing.—At this point there has been constructed a Howe truss through span of 130 ft., the east end resting on solid rock, & the west end on a frame timber abutment consisting of 24, 12 by 12 ins. posts on solid rock foundation. Rail level is about 60 ft. above river level, & the whole structure covers a distance of 140 ft.

Mile 64½, Kettle River, 3rd crossing.—At this point it is proposed to construct a Howe truss through span of 150 ft., supported on frame timber abutments, each consisting of 24 posts, 12 by 12 ins. The east abutment will rest on a rock-filled crib on solid rock foundation, & the west abutment on piles enclosed in a rock-filled caisson. The approaches are constructed, & consist of 12 trestle bents on piles. Rail level is about 30 ft. above river level, & the whole structure, when completed, will cover a distance of 360 ft.

Mile 67, Kettle River, 4th crossing.—Here it is proposed to construct two Howe truss through spans, one of 150 ft. & one of 100 ft. resting on pile abutments & pier. Each abutment will consist of 24 piles, & the pier of 28 piles, placed in rock-filled crib caissons. The approaches are built, & consist of about 80 pile trestle bents. Rail level is about 12 ft. above river level, & the whole structure, when completed, will cover about 1,470 ft.

The total combined length of bridges & approaches will be about 4,655 ft. Bridges built & proposed to be built are in accordance with the C. P. R. Co.'s standard plans, which have met with much approval, the only changes made being the substitution of steel clamp-plates & increasing the depth of the lower chords from 15 to 17 ins. in 100-ft. spans & 18 to 19 ins. in 150-ft. spans. The workmanship in all complete bridges is excellent.

Ties are of cedar, hemlock, tamarac & fir, both hewn & sawn. They are laid 24 ins. from centre to centre; faces are from 7 ins. to 8 in. width, & the thickness uniformly 7 in. In place of brackets, Servis tie plates are spiked to every tie on all curves of 6 degrees & upwards, holding the track in perfect gauge.

Track laying has been excellently done, the ties & rails presenting to the eye uniform straight lines & curves, without depressions, except at the few points where embankments have sagged. All curves have been eased off at both ends, & the outer rails elevated for velocities varying according to the retardation due to the curve & the particular grade on which the curve is situated. Rails break joint & are provided with the full complement of spikes, bolts, & angle plates.

Rails are of two kinds. Steel rails, 56 & 60 lbs a yard, used on portions of the main line of the C.P.R., have been relaid between West Robson & mile 5 & on the switchback at Bull Dog Tunnel, & also between the first crossing of Kettle River & Grand Forks, a total distance of 17.4 miles. The remaining 50 miles are laid with heavy new steel rails, 73 lbs. a yard. These rails are according to a design of the C.P.R. Co., & are extremely flat-headed. The 56 & 60-lbs. rails are provided with 4-hole angle plates, pierced for ¾-in. by 3¾ in. bolts. Nuts are hexagonal, & lock-washers are positive & national. The 73-lbs. rails are provided with 4-hole angle

plates, pierced for ⅞-in. by 4-in. bolts. Nuts are hexagonal, & lock-washers positive & national.

A double-wire telegraph has been constructed between West Robson & Grand Forks. Poles are 25 ft. long, 8 ins. diameter at the top, & from 150 to 200 ft. apart. This work has been well done.

The right-of-way has been cleared for 50 ft. on each side of the centre of the track.

Side tracks aggregating 19,298 ft. in length have been constructed at West Robson & 8 other points. Y's for reversing engines & cars have been constructed at West Robson, at summit of long tunnel switchback, & at Grand Forks. Water tanks, temporary & permanent, have been erected at 8 points, varying from 10,000 to 40,000 gall. capacity. The buildings consist of 9 neat, well furnished, serviceable section houses, 3 stations & a round house.

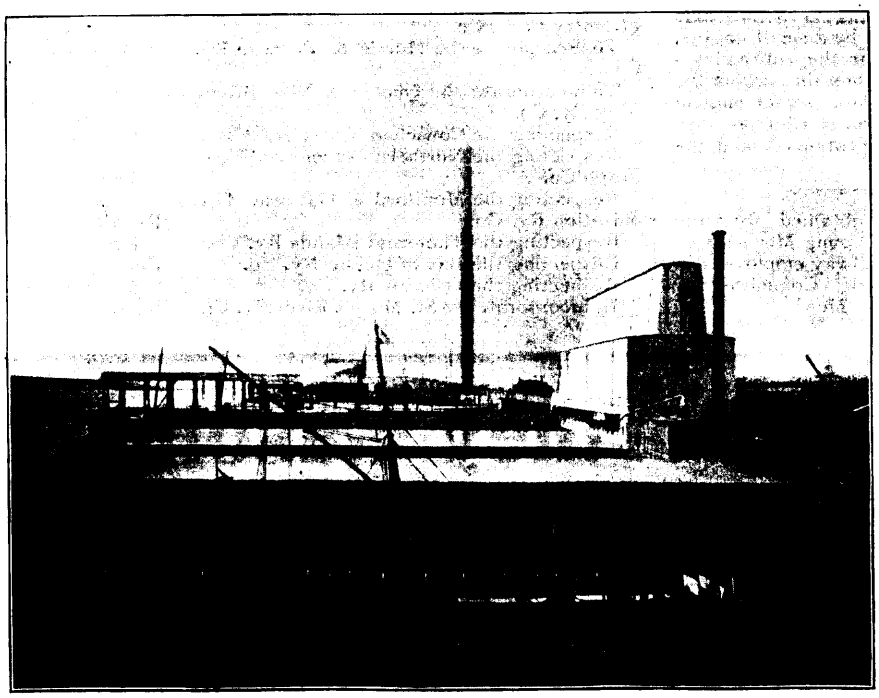
The West Robson-Grand Forks division of the C. & W. Ry. has been skilfully, though economically, located, & constructed under careful engineering supervision. For a new road it presents a finished appearance, all embankments & excavations being neatly sloped, the grading regular, the trestles & bridges symmetrically built, & the rails uniformly straight or curved. For a mountain railway the degree of curvature is light, & though nearly 50% of the whole length of railway consists of curves, the total amount is not excessive. The grades are steep, but are rendered necessary by the character of the country traversed. That the road bed is in excellent condition for traffic is proved by the fact that construction trains are being run up to speeds of 25 miles an hour, & no serious derailments have been made public. When the road-bed is fully ballasted, fully equipped with all the lesser details of a working railway, & placed under ample & constant inspection, it may be safely operated at speeds up to 25 miles an hour. Many necessary, though minor, details are still lacking, such as station houses, engine houses, repair shops, turntables, mile posts, fencing, signboards, whistling posts, caution posts, etc. The steep broken character of the mountain side-hill renders it probable that trouble will be experienced from snow-slides. So far only one small slide has occurred. Earth & gravel slides will be more or less common for some years to come, as in the case of all new railways.

Mr. Smith's report on the Grand Forks to Greenwood section of the line will be given in our next issue.

As stated in our introduction, Mr. Smith's report was written before the completion of the line. The whole road between West Robson & Midway has since been thoroughly ballasted, & we are informed by competent judges that it is one of the best pieces of new work they have ever seen. No safety switchbacks have been constructed, & we understand that it is not the intention to put any in. It is contended, notwithstanding what Mr. Smith says, that in no place on this continent, & probably on no other, are safety switchbacks used on such grades as exist on the C. & W.R. All the Howe truss spans which Mr. Smith refers to have been built. The trestle at mileage 68.1, which was temporary, has been replaced. The bridge at the crossing of Boundary Creek, 89.4 miles from West Robson, has been completed.

Grand Trunk Railway Elevators.

The illustration on this page shows the G.T.R. elevator at Portland, Me., which has a capacity of 1,000,000 bush. It is thoroughly equipped with all the modern conveniences for handling export grain. It is 221 x 97½ ft. & 160 ft. high. The engine house is of brick 80 x 41 ft., & has a steel-plate smoke-stack lined with brick, 13 ft. in diameter at the base, & 161 ft. high. The foundation is formed by building granite & concrete piers, & walls on piling. The bins, which are 66 ft. deep, are supported by heavy posts. The basement extends under the entire house, & is well ventilated & lighted, & has a concrete floor. The basement contains a system of cross-belt conveyers by which grain can be taken from any of the bins. Two receiving tracks extend through the house, & 10 receiving legs, with an elevating capacity of 8,000 bus. an hour, take the grain from the sinks to the cupola. The grain is unloaded from the cars with power shovels. There are also 5 loading spouts equipped with bifurcated loaders. In the first story of elevator or working floor is a car puller with two drums arranged for pulling cars on both tracks at the same time, by means of wire cable.



GRAND TRUNK RAILWAY ELEVATOR AT PORTLAND, MAINE.

The first floor of the 5-story cupola is the distributing floor. It contains 20 Mayo trolley spouts & 12 telescope trolley spouts. The Mayo spouts distribute the grain from the scale hoppers, & the telescope spouts distribute grain from a reversible belt conveyer, which runs the full length of the second floor of the cupola. This conveyer is supplied with an automatic travelling tripper. The third story of the cupola contains ten 1,200-bus. Fairbanks' hopper scales. The fourth is the garner story. Along one side of this story, extending the full length of the building, is a line shaft from which power is taken to drive the elevators. The top story is occupied by the elevator heads & the spouting from them to the garners. Each elevator head is provided with a switch head so that grain may be spouted into either of two garners. The entire 10 elevators may be used for either shipping or receiving.

There is a complete system of pneumatic sweepers throughout the entire house arranged to discharge dust into the furnace where it is burned. A complete system of fire protection is furnished by a standpipe & hose connection at many points about the house. A duplex pump in the engine-room supplies water.

There are two stairways leading from the first story to the cupola, one at each end, & at one end is a passenger elevator, which runs from the first story to the top of the elevator. Along the side of the elevator is a belt gallery which leads to 2 belt galleries running along each side & the entire length of the Atlantic wharf. The galleries are 50 ft. above the wharf. Two systems of belt conveyers traverse these galleries, & are supplied with iron trippers, which will trip grain into any hatchway of a vessel. The shipping capacity is 40,000 bus. an hour, and 3 ships can be loaded simultaneously.

The power plant consists of a battery of four 60-in. boilers, & a pair of horizontal non-condensing Corliss engines, 24 x 42 in. stroke. All power is transmitted by means of rope drives, & all machinery which is required to start or stop while the shafting is in motion is provided with friction clutches.

John S. Metcalf Co., Chicago, were the architects & engineers of the building, etc.

A grain transfer house has recently been completed in the G.T.R. yards at Elsdon, Ill., near Chicago. This elevator is 36x120 ft., & 130 ft. high, with a track shed 15 ft. wide on each side, & extending the full length of the building. The foundation consists of concrete piers, resting onpiles. The elevator is a frame structure, the bins being of the usual crib construction, & is equipped with first-class machinery for rapid handling & transferring of grain. The shipping track runs through the shed on the south side of the house, & the receiving track through the north shed. The elevator is equipped with 3 receiving legs of 8,000 bush. capacity per hour. They have large sinks, & each leg is supplied with a pair of power shovels. The 3 shipping legs are each of 6,000 bush. capacity. On the shipping side of the elevator there are also 4 car-loading spouts, fitted with car-loaders. These spouts are located far enough apart so that 4 cars can be placed on the track & loaded simultaneously. On the 1st floor of the elevator is located the heavy geared car-puller, having 2 wire rope drums so asranged as to pull cars on either track with steel wire cable & heavy car-puller hooks. On the first floor are also located 4 no. 9 oat clippers, arranged so as to spout to 3 elevator legs put in for handling the grain from the clippers. On the roof of the track shed on the shipping side of the house are located 4 dust collectors for the above mentioned clippers. Under these dust collectors is a pipe connected with the sweeper system

fan which takes the dust from the clippers, together with the dust from the sweepers located throughout the building, & discharges it to a large cyclone, on the top of the boiler-house, which is connected with the furnaces of the boilers.

In the cupola of the elevator are six 1,400 bush. garners, which receive the grain from the elevator heads & discharge to six 1,400 bush. scale hoppers resting on Fairbank's scales. These scales discharge to 6 distributing spouts, which in turn discharge to the different bins through holes in the distributing floor. The 3 clipper legs ending on the distributing floor are supplied with telescope distributing spouts to distribute the grain to the bins. The capacity of the elevator is only 118,000 bush., quick handling & transferring of the grain rather than large storage capacity being required for the business.

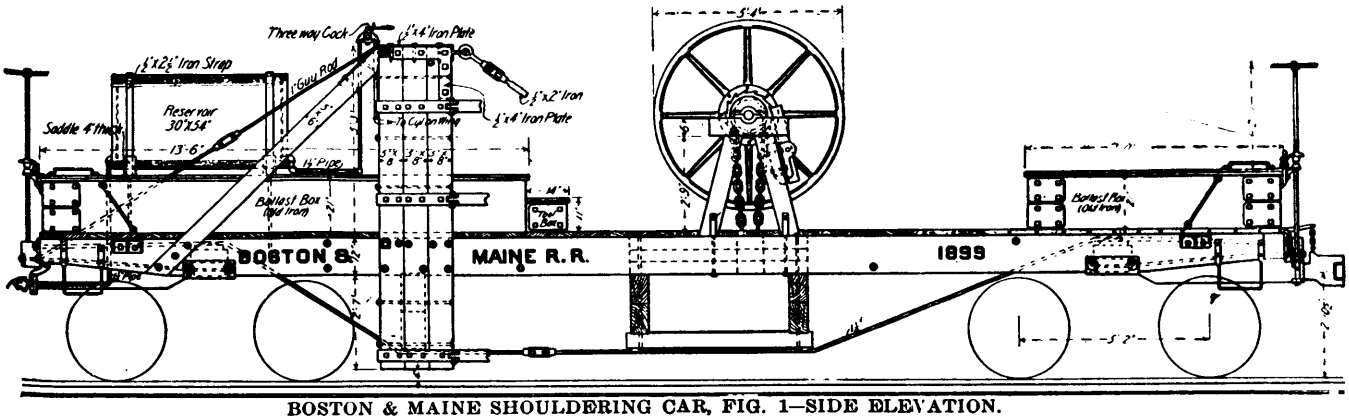
The elevator is equipped with signals & electric bells & other appliances to facilitate its operation. At one end of the elevator is located the brick power-house. In the boiler-room are 3 horizontal tubular boilers, the heater & feed pump. A 450 h.p. Corlis engine furnishes ample power for the machinery of the elevator. In the engine-room is also located a dynamo, driven by a small engine, which supplies the light for the entire elevator. All of the transmissions throughout the elevator, excepting the fan, are of manilla rope. John S. Metcalf Co., of Chicago, furnished the plans & specifications & built the elevator.

Permission has been obtained from the Czar to establish a sort of Young Men's Christian Association among railway employees in Russia. It is to be called "Committee for the Improvement of Young Men."

Recent Dominion Legislation.

Among the acts passed at the recent session of Parliament are the following which especially relate to the transportation & allied interests:

Respecting the Kaslo & Lardo-Duncan Ry. Co.
Respecting the B.C. Southern Ry. Co.
Respecting the Montreal & Ottawa Ry. Co.
Respecting the Canada & Michigan Bridge & Tunnel Co.
Respecting the C.P. Ry. Co.
Respecting the Hereford Ry. Co.
Respecting the Niagara Grand Island Bridge Co.
Respecting the River St. Clair Ry. Bridge & Tunnel Co.
Respecting the Canada Southern Bridge Co.
Respecting the Pontiac Pacific Junction Ry. Co.
To incorporate the Port Dover, Brantford, Berlin & Goderich Ry. Co.
Respecting the Ontario & Rainy River Ry. Co.
Respecting the Montreal, Ottawa & Georgian Bay Canal Co.
To incorporate the Morris & Portage Ry. Co.
To incorporate the Quebec & New Brunswick Ry. Co.
Respecting the Cowichan Valley Ry. Co.
Respecting the Northern Commercial Telegraph Co.
Respecting the Montford & Gatineau Colonization Ry. Co.
Respecting the Thousand Islands Ry. Co.
Respecting the Bay of Quinte Ry. Co.
Respecting the Oshawa Ry. Co.
To incorporate the St. Mary's River Ry. Co.
Respecting the St. Clair & Erie Ship Canal Co.
Respecting the Lake Erie & Detroit River Ry. Co.
Respecting the Brandon & Southwestern Ry. Co.
To amend the "Admiralty Act, 1891."
Respecting the Restigouche & Western R Co.
Respecting the Yarmouth Steamship Co.
Respecting the Quebec Bridge Co.
To incorporate the St. Lawrence Termina & Steamship Co.
Respecting the Western Alberta Ry. Co.
To incorporate the Royal Marine Insurance Co.
To incorporate the Comox & Cape Scott Ry. Co.
To amend the act relating to ocean steamship subsidies.
Respecting the Red Deer Valley Ry. & Coal Co.
To incorporate the South Shore Line Ry. Co.
To amend the Pilotage Act.
Respecting the construction of a branch railway from Charlottetown to Murray Harbor.
To incorporate the British America Pulp, Paper & Ry. Co.
Respecting the Central Vermont Ry. Co. (Foreign).
To authorize the granting of subsidies in aid of the construction of certain lines of railway.
To amend the Railway Act.
To incorporate the Quebec & Lake Huron Ry. Co.
Respecting the Nipissing & James Bay Ry. Co.
To incorporate the Manitoulin & North Shore Ry. Co.



BOSTON & MAINE SHOULDERING CAR, FIG. 1—SIDE ELEVATION.

To incorporate the Quebec Southern Ry. Co.

Respecting the Algoma Central Ry. Co.

Respecting the British Yukon Mining, Trading & Transportation Co., & to change its name to the British Yukon Ry. Co.

Respecting the Dominion Atlantic Railway Company.

Respecting the Buffalo Ry. Co. (Foreign).

Respecting the Safety of Ships.

To incorporate the Ottawa, Brockville & St. Lawrence Ry. Co.

Respecting the Salisbury & Harvey Ry. Co.

To incorporate the Lake Superior & Hudson's Bay Ry. Co.

Respecting the Schomberg & Aurora Ry. Co.

Respecting the Timagami Ry. Co.

To confer on the Commissioner of Patents certain powers for the relief of the Servis Railroad Tie Plate Co. of Canada, Ltd.

A Roadbed Shouldering Car.

F. Barr, Assistant General Manager of the Boston & Maine R.R., has favored us with a photograph & drawings of a shouldering & levelling car, built at the Co.'s shops. It consists of a specially constructed flat car with wings fitted with interchangeable knives. The wings can be extended or contracted & the knives raised or lowered either by hand or by air, depending upon the construction of the car. The following description of it is taken from the Railway & Engineering Review:

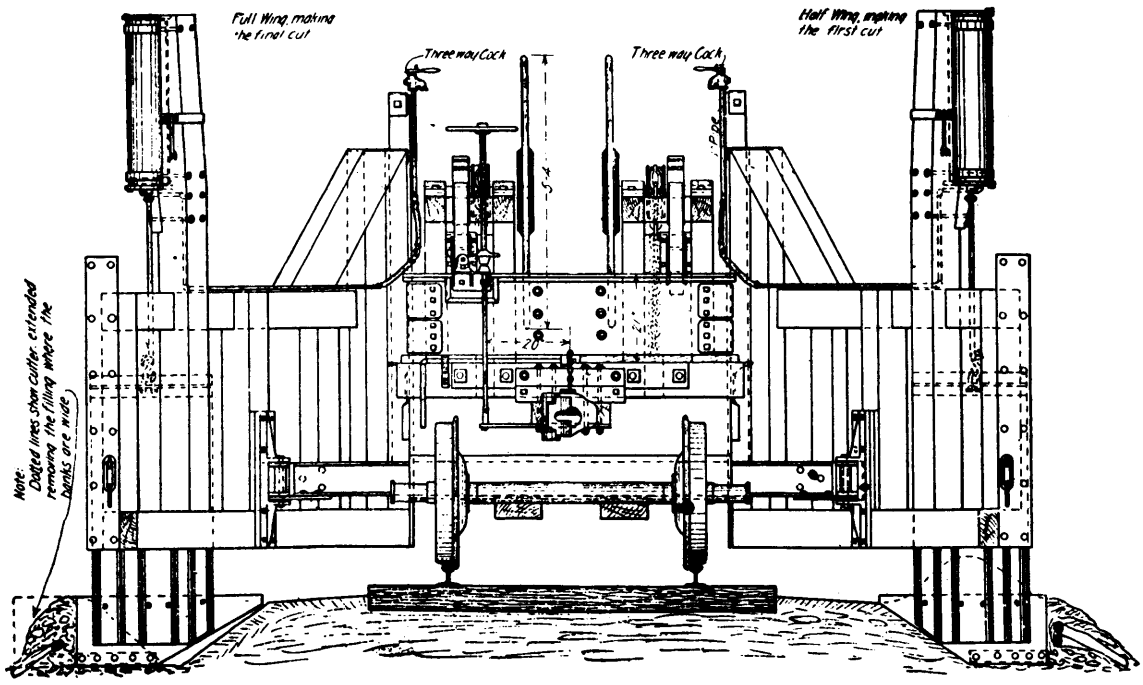
The length of the car over end sills is 34 ft. & the capacity 70,000 lbs. The width over side sills is 6 ft. 4 ins. & the distance from the outside of the end sill to the centre of the body bolster, 4 ft. 8 ins. The distance between centres of needle beams is 4 ft 4 ins., & the height from the top of rail to the centre of the drawbar, 2 ft. 10½ ins. It is equipped with M. C. B. vertical plane pocket couplers. Four of the longitudinal sills in the framework are 5x12 in. timbers, two other longitudinal sills are 5x8-in. timbers, & the two end sills are 7x8-in. timbers. The body bolsters are constructed of wood & iron.

Fig. 1 shows the side elevation of the car, with the wings removed. The wings are hinged to upright posts standing against the side sills, at either side of the car, & securely braced both crosswise the car & longitudinally. The position of the wings is controlled by sliding struts guided within the boxed way suspended from the middle portion of the car, & forced in or out by the large hand wheel & chains appearing in this view. The wings are constructed of heavy timbers strongly framed together. The cutter knives, carried at the bottoms of the wings, may be operated either by compressed air, as shown in the rear elevation view, fig. 2; or by rack & pinion as shown by the half-tone view of the car in service, fig. 3. By using air there is a saving of the labor of 3 men, as 1 man can operate the cutters by air, but 4 men are required to raise or lower them when both wings are being used on single track, or 2 men, if only one wing is being used, as on double track.

The air cylinder for operating each cutter is 10 ins. in diameter, stands vertically (fig. 2), & is attached to a support which is part of the wing. In the rack and pinion arrangement a hand wheel is attached to the opposite end of the shaft to which the pinion is secured, the rack being secured to the cutter. Fig. 1 shows the air receiver, 30 ins. in diameter & 54 ins. long, located at the end of the car which is forward while the car is in service. At either end of the car are ballast boxes, in which old iron can be placed to hold the car down to its work. The manner of admitting air to the operating cylinders, & other details, are made clear in the accompanying illustrations. It should be noted that the position indicated for the right wing, in fig. 2, is half way open, while the left wing is shown fully extended.

Fig. 4 represents a cross section of the roadbed showing the condition of the shoulders after the car has passed over them. The dotted line shows the reach of the knife moved out to its extreme length. A special cutter for levelling purposes has a reach of 12 ft. beyond the rail.

This machine has been used on the B. & M. for a variety of purposes, as explained by the following account from Mr. Barr: "One use of it has been the levelling of the subgrade for a parallel track, or any work calling for the displacement of material within reach of the machine, such as widening out a fill or grading for additional tracks. By extending the wings, gravel or other material can be levelled off to a width of 12 ft. or more from the track & to any depth desired not exceeding 18 ins. All surplus material may be removed from both sides of roadbed on single, & from outside of double, track to leave a uniform shoulder of any shape desired, cut with lines exactly parallel to the rail whether on straight or curved track. As a result, a uniform cross section is not only obtained, but the drainage of the ballast is greatly improved, thereby doing away to a large extent with shimming during the



BOSTON AND MAINE SHOULDERING CAR, FIG. 2.—REAR ELEVATION.

winter months. Weeding & ditching can also be done. By the use of this car the work can not only be executed with perfect uniformity, but it can be done without the employment of large crews of laborers, & at a saving of 85% on what it costs to do the work by hand. The force required to operate it properly, in addition to the locomotive, consists of a train crew, a foreman & 4 men. As illustrating the difference in time & expense of work done by this car & the same kind of work done by hand, a 30-mile section of the B. & M. trimmed with the car in 4 days could not have been formed by hand in the same time with less than 375 men, as shown by following report of one of its roadmasters:

"'I took the standard cross section which was given by the engineer's department at that time, & kept figures on the cost of putting the shoulder on, which was practically the same as put on by the shouldering car, & I found that it cost us about $75 a mile. This would allow about 100 ft. a day per man. To cover the 30 miles, which we did in 4 days' time with the levelling car, it would have taken 375 men 4 days at a cost of $2,025. The total wages of men in the shouldering car outfit were $114.20. To this expense should properly be added $378, the wages of 70 men employed in levelling back material which the car could not reach, & clearing up material in cuts that the car could not dispose of, making the total expense $492.20.'

"This railroad has found that it costs not less than 4 times as much to do the work by hand as when this device is used. Then, again, the work when completed by hand, even under the best conditions, will be irregular, while that done by this machine will be absolutely uniform. The actual amount of track covered in a day's work will depend upon the kind of material & the amount moved; also the width of the bank over which the material is to be put & the frequency of trains. The B. & M. has moved 500 yards of fill, levelling it 6 ins. below the top of ties & 10 ft. from rail, for a distance of 1,000 ft. in 25 minutes."

The car will be in service on the B. & M. during the entire season. For other cuts see pg. 233.

The Department of Marine has issued a pamphlet, "The Currents in the Gulf St. Lawrence, including the Anticosti Region, Belle Isle, & Cabot Straits," the information contained in it being condensed from the reports of the surveys of tides & currents for the seasons of 1894, 1895 & 1896.

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

Atlantic Division.—The Co. has purchased property at Bay Shore, St. John, N.B., on which to place a big coal dump of from 20,000 to 30,000 tons. The coal will be taken to Carleton in barges & hauled to the dump, where it will be piled for winter use.

New steel rails, weighing 80 lbs., are being laid on 8 miles between St. John, N.B., & Vanceboro, Me., replacing 56 lbs. rails. This will complete the line of heavy rails throughout from St. John to Montreal.

McAdam Jct. Station.—On page 235 are illustrations showing the main track elevation & the ground floor plan of the station now being erected at McAdam Jct. It will be a handsome 2½ story structure of McAdam grey granite, with Welsford red granite corners, which will make a pretty contrast in color. It will be 133x36 ft., with a basement 60x36 ft., in which will be located the coal cellar, kitchen, larder, scullery, laundry, drying room & boiler room. On the ground floor will be the lunch room & dining room, which will form part of the hotel, & ladies' & general waiting rooms, toilet rooms, ticket office, baggage & express rooms. The first floor will be divided, half being taken up by the hotel accommodations, which will consist of 7 bedrooms, parlor, reading & writing room, bath room & closets. On the other end of this floor, & separated from the hotel, will be the offices of the Superintendent & staff, train despatchers, train master, conductors, agent, freight & customs. The attic will contain 4 bedrooms for the hotel servants. A verandah will surround the entire structure.

Montreal Terminals.—The Co. recently applied to the Montreal Harbor Commissioners for use of the space adjoining its elevators, which had been assigned to the Johnson Steamship Line, but which was not being used by any boats. The Co. wants this space for the extension of its terminal facilities.

Work is proceeding between Mountain st. & the city limits, providing additional yard space & shunting grounds.

Owen Sound.—A two-story office building & additional freight shed has been built here. (Feb., pg. 39.)

Guelph.—It is said that a connection will be made between the Co.'s line at Guelph & the Guelph electric street railway.

Ottawa Station.—The building which is being erected to replace the station burned a few months ago will face on Broad st., & will be about 600 yards north of the site of the old building. It will be of stone & brick. The contractors are Lyons & White, of Ottawa, & the contract price is said to be $35,000. The aqueduct is being bridged to make room for the additional tracks to reach the station. (June, pg. 173.)

Ottawa Connecting Line.—Although nothing definite is being done about the construction of the proposed line across the city to connect the Co.'s union station, near the Chaudiere Falls, with the central station near the canal basin, it is said that the matter is not being lost sight of, & that negotiations are going on with a view to acquiring land on the south side of Wellington st. & along Division st. For part of the way the line will run parallel with the Canada Atlantic tracks. It is said to be probable that a subway or an overhead crossing will be put in at Bank st. (June, pg. 173.)

Carleton Place Shops.—We are officially informed that there is no truth in the report which recently appeared in some of the daily papers, stating that the Co.'s shops are to be moved from Carleton Place to Ottawa.

Spur at Webbwood.—The Spanish River Pulp Co. is said to have completed plans for building a spur from the Sault Ste. Marie branch to its mills at Webbwood.

Fort William.—Large additional coal unloading & storage facilities are being provided east of the old coal dumps, towards the lighthouse near the mouth of the Kaministiquia river. (Feb., pg. 39.)

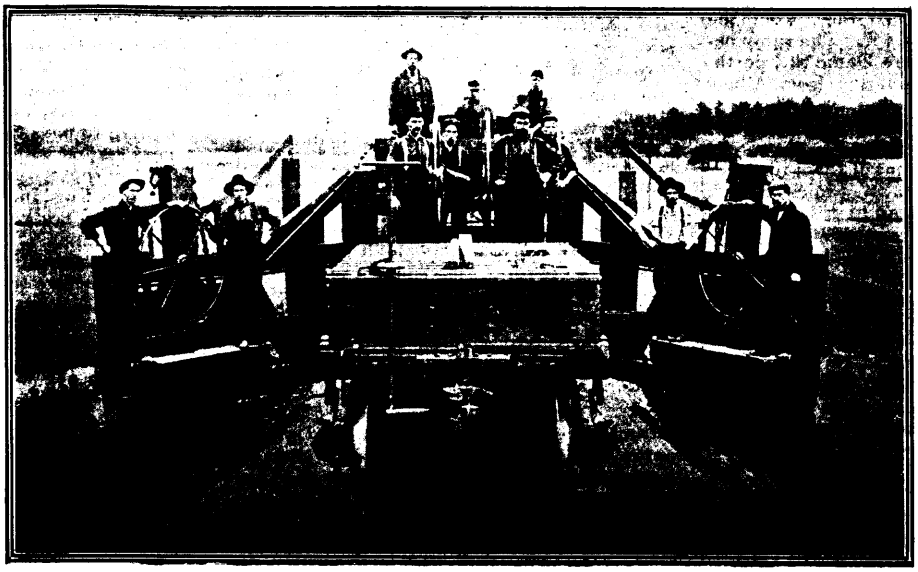
Fort William to Winnipeg.—The question of double tracking the line between Fort William & Winnipeg appears to have been dropped for the present at least, & it is within the probabilities that it will be shelved for several years, as by increasing the number of crossing sidings & lengthening existing ones the necessity for the second track, which for some years to come would only be required during a very few months of the year, can be largely obviated. (Feb., pg. 39.)

The following is reproduced from the Port Arthur Herald:—"It is said that the survey made for the C.P.R.'s new line from Fort William to the height of land crosses the track of the Ontario & Rainy River Ry. three times. Another trial line will be run. We are told that it is altogether likely the O. & R.R. Ry. Co., will be approached by the C.P.R. with a view to having the tracks of the former Co.

shifted a slight distance south of the present line, so as to allow the C.P.R. to lay its new track free of the crossings mentioned." (May, pg. 140.)

Fort William to Medicine Hat.—Several engineering parties have been at work for some time making surveys with a view to the reduction of gradients & curvature on the main line between Fort William & Medicine Hat.

Dyment to New Klondike.—On June 13 Contractor J. D. McArthur started grading a branch of 7 miles from Dyment, 182.1 miles west of Fort William, to the New Klondike mining district. The Keewatin Gold Mining Co., which purchased a claim at the terminus of the branch from Senator Watson, of Manitoba, and others, is going to operate it, & the branch is being built simply for ore traffic. At the recent session of the Dominion Parliament a cash subsidy of $22,400 was voted for this branch.



BOSTON AND MAINE SHOULDERING CAR IN SERVICE. FIGURE 3.

Bridge Over Red River.—A short time ago it was stated in Winnipeg papers that the Co. had decided to build a bridge over the Red River at Winnipeg, to be used in place of the present Louise bridge. We are informed that no arrangements have been made for building another bridge, and that nothing has been done further than to make some surveys. We think it probable that the question will come up in the course of the next year or so, as the Louise bridge is not at all well adapted for the increased traffic, being used also for vehicles which very much interfere with the train service.

Deloraine-Waskada Branch.—The Dominion Parliament at its recent session granted a cash subsidy of $64,000 for the extension of this branch further westward for a distance not exceeding 20 miles. The Manitoba Government has been negotiating with the C.P.R. Co. about going on with the work, but it is not considered likely that it will be proceeded with this year at least, on account of the partial failure of the Manitoba crops. (Jan., pg. 7.)

McGregor-Varcoe Branch.—The 20 miles of grading, which were completed last year, have been extended to mileage 26.45 at Wellwood. (May, pg. 141.)

The Acton Burrows Co.'s enameled iron signs are to be used for station names on this branch, instead of painted wooden signs.

Pipestone Branch Extension.—It is expected that this branch will be completed this year to 50 miles west of Antler, last year's terminus, which will carry it to Clare at the west end of the Moose Mountain. (May, pg. 141.)

Crow's Nest Pass Ry.—J. W. Stewart has completed his contract for grading on this line from Procter's Creek, on the south side of the west arm of Kootenay Lake, to Five Mile Point, near Nelson. It was principally side hill work, a good deal of rock being encountered. The gradients & curvature are light. A slip has been built for the Co.'s steamboats at Procter's Landing, & a movable slip is also being provided there. Another slip is to be built at Nine Mile Point. The line is being connected with the Nelson & Fort Sheppard Ry., from which running rights have been secured into Nelson. (Mar., pg. 71.)

C. F. Hannington is said to have made a survey for a line from Sand Creek, near where the Crow's Nest Ry. crosses the Kootenay river, to Golden on the main transcontinental line.

Arrowhead & Kootenay Lake Branch.—The grading done last year has not been continued this year. (June, pg. 173.)

It is reported that surveys are being made for the proposed extension of the Lardo branch, northeast from the Divide & down Toby Creek into the mining region of the Windermere district.

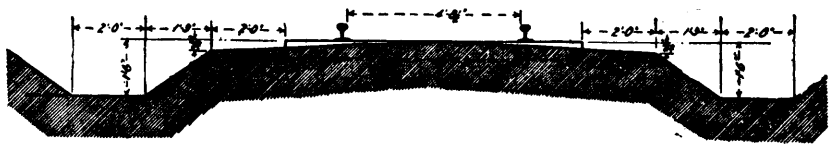
Slocan Branch.—A survey has been made for a branch of 10 miles, starting from the Slocan City branch at Lemon Creek. (Feb., pg. 40.)

Columbia & Western Ry.—The last section between Greenwood & Midway was turned over to the operating department June 10. (June, pg. 173.)

A very complete description of this line between West Robson & Grand Forks is given on pg. 225.

Although surveys westward to a connection on the main line at or about Spence's Bridge have been completed, construction will not be proceeded with beyond Midway this year. (Feb., pg. 39.)

Vancouver Terminals.—The general improvements now being carried on by the Co., on the harbor frontage will, when completed, add many acres to the Co.'s foreshore property, & will greatly inprove the appearance of the city's frontage. Much time will be required to complete the improvements, & the expenditure of a vast sum, estimated at from $850,000 to $1,000,000. No one company in Canada will then possess so valuable a foreshore as the C.P.R.



CROSS SECTION OF ROADBED, BOSTON AND MAINE RY. FIGURE 4.

Grand Trunk Betterments, Etc.

Point Levis.—The Co. will erect a building large enough to house all the immigrants bound for the U.S. Immediately on the arrival of a ship the steerage passengers will be separated into two parties, those going to Canada & those to the U.S., so that the U.S. Commissioners will be able to conduct the examination in their own building without being delayed by those immigrants with whom they have nothing to do. The new building will be supplied with a lunch counter, good water & all sanitary appliances. The object of this change is partly to avoid the delay of through international trains at the U.S. frontier.

Victoria Jubilee Bridge.—The Dominion Parliament at its recent session voted $230,000 to make up the grant in aid of the rebuilding of this bridge to $500,000.

Abolition of Montreal Level Crossings.—Early in July the Co., without first obtaining permission from the city authorities, laid a track across Aqueduct St., as a temporary spur from the main tracks to the yards back of the freight sheds, to be used for taking in material for the erection of additional freight buildings. On the matter coming before the City Roads Committee, General Assistant Wainwright appeared for the Co., & stated that the track has been laid under instructions from an official who was ignorant of the city bylaws & asked that it be allowed to remain temporarily. This request was refused & the track was taken up, a request to be allowed to relay it being also refused. This incident brought up again the question of abolishing all the Co.'s level crossings in the city. After a conference between General Manager Hays & the Committee, he submitted the following proposition:—"Confirming my statement at our conference that I was prepared to make a proposition in connection with the reparation of the level crossing of our tracks at Mountain St., I enclose plan of the proposed viaduct, prepared by our Chief Engineer, & will state that the G.T.R. is prepared to at once undertake the erection of viaduct in accordance with this plan, estimated to cost $135,000, & will pay half of the original cost of said viaduct, upon condition that the city will pay the remaining one half of the cost of erection & maintenance & will thereafter maintain & renew & will assume & pay any incidental or consequential damages to adjacent property or business arising in connection with the separation of the crossing. We will then be prepared to enter into an agreement with the city on the same general terms as above set forth, for the separation of the level crossings remaining between Mountain Street & St. Henri, by the elevation of our tracks as soon as the details can be agreed upon as to streets necessary to be vacated, overhead clearance, width of subways, time of completion, etc., etc., all of which questions, I take it, the city will desire to have passed upon by its Engineering Department,

&, until this has been done, it will, of course, be impossible to make detailed plans."

Engineer McNab, of the G.T.R., explained to the committee that the projected bridge was on one side of the street & the homologated line on the other. The width of the proposed bridge was 27 ft., with a projection of 5 ft. on each side. The width for vehicle traffic was 27 ft. The floor beams were extended in such a manner that there would be sidewalks on each side of 5 ft. The ramp began about 50 ft. from Notre Dame St., northern side, & ran up to about 9 ft. from Albert St. They then crossed Albert St. by a span of about 150 ft. Then came a larger span of 210 ft., which passed over the present tracks in Bonaventure, which brought them to a pier on the southern side of St. James St., at which point the ramp began to descend, until it met Mountain St. at the southerly side of the Boys' Home, 207 ft. St. James St. was crossed by a bridge of 54 ft. span, under which the St. James St. traffic would pass. The height was about 20 ft. For pedestrians, they would cross—if they did not choose to take the centre of the road—by sidewalks which were reached by stairways leading from Mountain St., on the westerly side, & from St. James St. on the easterly. There was a stairway leading from the southerly side, about 225 ft. from Notre Dame St. The stairways had been designed so as to not damage more than necessary adjoining houses. A tunnel would not be more practical than a bridge, as continual pumping would be necessary.

The committee decided to refer the matter back to the G.T.R. authorities, to have plans & estimates prepared for an elevated line from Bonaventure station to St. Henri. (Sep., '99, pg. 266.)

Montreal General Offices.—Satisfactory progress is being made with construction. There was some delay at the start, owing to the lack of structural iron & steel, which kept back the contractors for the stone cutting, masonry & brickwork, but this has been overtaken, & the iron & steel supplies are at present abundant. September is spoken of as the date upon which the walls of the building will be complete. Indiana limestone is employed upon the front & sides. This, when dressed, presents a beautiful, clean, marble-like appearance. The blocks of stone come in huge masses, weighing from 10 to 18 tons. These are fashioned into the desired shape in the contractors' yards. The scroll & figure work, which showed beautiful effects in the plans prepared by the architect, are being carried out in front around & over the central entrance, which is nobly proportioned. The interior work will be started just as soon as the building is sufficiently advanced to permit of such work being carried out. It is to be fitted up after the best examples which this continent affords, & it is said it will be one of the handsomest railway offices in the world. (April, pg. 109.)

Thousand Islands Junction.—It is said that the location of this station may be changed to a point about 2 miles east of the present site.

Queen St. East, Toronto.—Work has been commenced on the new station building. (June, pg. 175.)

Beautifying Stations.—The management is paying a good deal of attention to beautifying station grounds by sodding lawns & planting flowers. A good instance of this is afforded at Allandale, where the bahk between the tracks & Kempenfeldt Bay has been sodded & several flower-beds made. The water-front at Barrie station has been similarly treated.

Hamilton-Niagara Falls Double Track.—The contract for this work has been given to Rogers & Taylor, of Montreal. (April, pg. 109.)

Hamilton Yard.—The Stuart St. yard is being remodelled. Among other improvemens 4 tracks will run into the station, instead of 3 as at present.

International Bridge.—A large force is at work renewing the superstructure on this bridge between Fort Erie, Ont., & Buffalo. (Mar., pg. 71.)

Brantford Bridge.—The city of Brantford wants the Co. to add another span to its bridge, as part of the scheme to prevent a recurrence of spring floods.

Brantford & Main Line Trains.—General Manager Hays recently wrote the Board of Trade that the Co. would before long submit a proposal for running main line trains through Brantford. Several of the operating officials recently went over the route of the proposed cut off between Lynden & the Buffalo & Goderich line. The construction of a station in Brantford close to Market St., & the removal of the freight sheds to a new site south of the present station, is also said to be contemplated. (Mar., pg. 71).

London.—Extensive improvements are to made here. Work will be at once begun on the completion of a double track from East London to the Cove bridge. A new bridge will be built at the Cove to accommodate the double track. This track will in the near future be continued westward to Komoka. This double tracking is the nucleus of the double track which will soon extend from Hamilton to Komoka. West of Komoka the double track will not be needed, as the traffic divides at that junction. Many changes will be made in the yard here. Two extra tracks will be put in at the station, making 4 tracks exclusively for passenger traffic & 2 for freight. The station platform will be lengthened & widened.

At Detroit, Mich.—July 17, the bridge over the Chicago & G. T. & the Lake Shore & Michigan Southern Rys., at Congress & Dequindre streets, was wrecked by a train attempting to pass through it which contained 2 cars loaded with iron bridge spans. The height of these spans above the car decking was about 6 ins. more than the overhead structure of the bridge through which the train was attempting to pass gave clearance for; in consequence the bridge was very badly damaged before the train could be stopped.

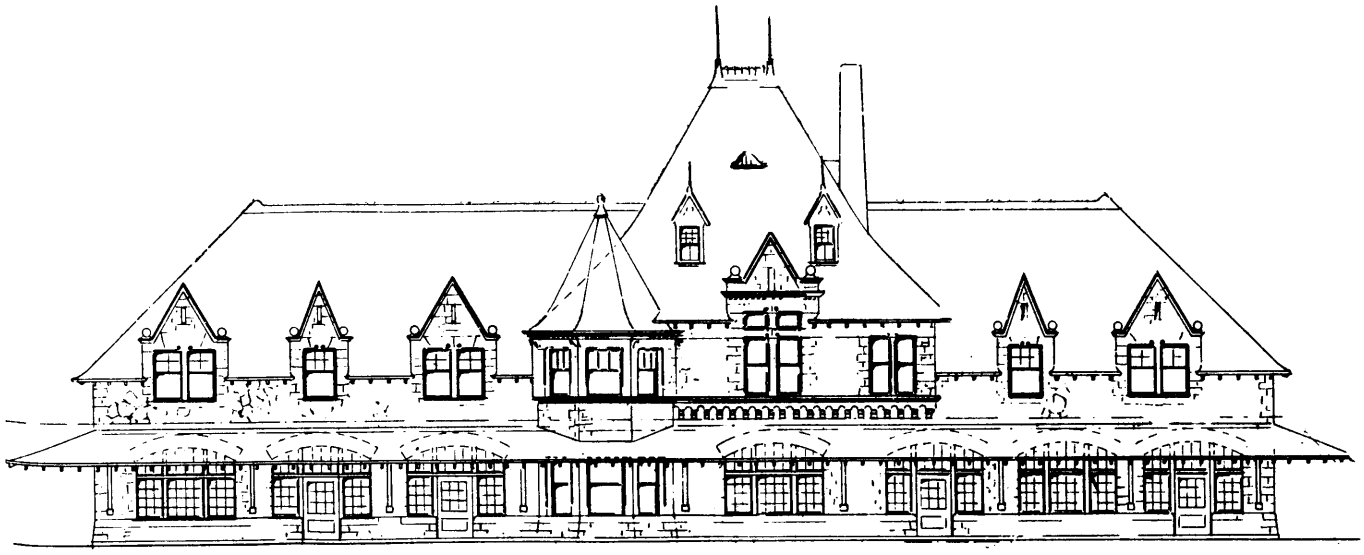
Chicago & Grand Trunk.—Now that the financial affairs of this road have been settled the work of double tracking will be pushed on vigorously. (June, pg. 175.)

C.P.R. Station Gardens.—The agents at the various stations on the lines east of Fort William are being encouraged to put their grounds in a neat condition, & have been supplied with a variety of flower seeds.

The Canadian Society of Civil Engineers had a membership on Jan. 30 last of 847, against 716 on Jan. 30, 1899. It is comprised as follows: Honorary members, 7; members, 308; associate members, 289; associates, 40; students, 203.

J. J. Gartshore, Toronto, reports the following recent shipments: Niagara, St. Catharines & Toronto Ry., for its Niagara Falls & Port Dalhousie extension, 300 tons rails; Preston & Berlin Electric Ry., 300 tons rails; Woodstock, Thames Valley & Ingersoll Electric Ry., 150 tons rails; Beck Mauufacturing Co., Penetanguishene, 1 yard locomotive.

Beech Sleepers. - Experiments are being made in Germany with beech as a material for railway sleepers. It has been found that without preservative treatment they are apt to rot internally though they may be apparently sound on the exterior. On the Alsace-Lorraine lines, favorable results have been obtained with creosoted beech sleepers, which have shown an average life of 19½ years, while others preserved with zinc chloride have proved still more satisfactory, their life being 21½ years.



TRACK ELEVATION, MCADAM JUNCTION STATION, CANADIAN PACIFIC RAILWAY.

C.P.R. Tracklaying by Machinery.

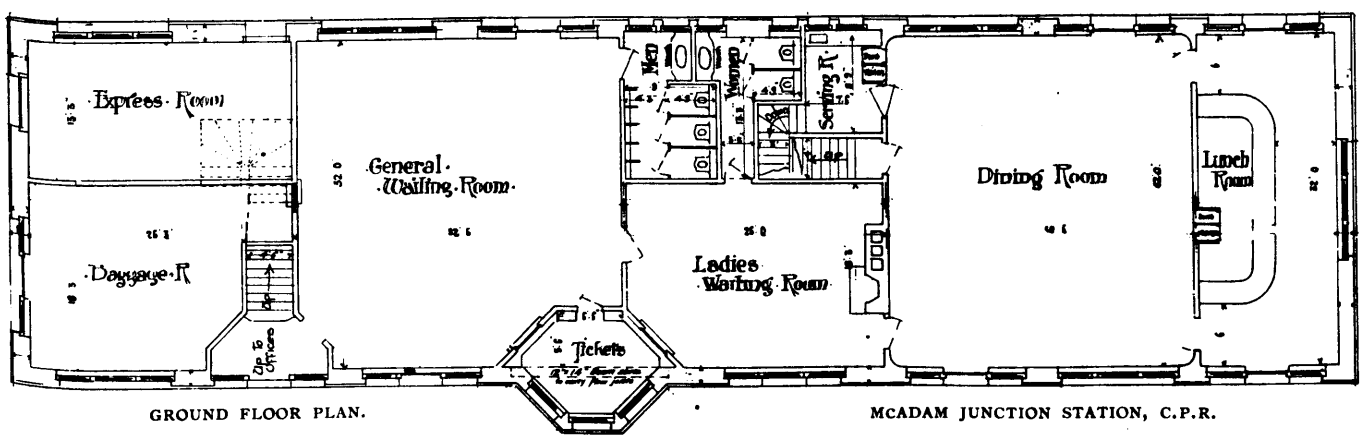
The following description of the work of a steam tracklaying machine on the C.P.R.'s Columbia & Western branch in B.C., has been prepared by A. C. Dennis, Division Engineer of Construction. The tracklaying machine consists of a head or "pioneer" car fitted with side chutes for delivering the rails & ties on the ground ahead of the train, & having a stationary steam engine to operate the rollers in the chutes. Similar chutes or tramways extend along each side of the flat cars of the material train, these chutes being carried by brackets inserted from the bottom of the stake pockets. Ordinary flat cars are used. The chutes are connected between the cars, & in the bottom of each chute are live rollers, the alternate rollers being driven by a shaft extending the whole length of the train & being fitted with universal couplings between the cars. The vertical engine on the head or pioneer car drives the shafts by means of gearing & takes its steam from the locomotive. The rails are sent forward on one side of the train & the ties on the other, the ties being delivered by the chute about 60 ft. ahead of the rails, while the rail chute extends about 6 ft. beyond the car. The driven rollers of the tie chute have corrugated surfaces, to get a good hold on the ties, while the alternate rollers are plain & are set about 1-in. lower than the others.

The material train is made up of the rail cars in front of the locomotive & the tie cars behind. At the material yard 8 men & a foreman were employed in unloading, sorting & reloading rails & fastenings, & in curving rails. Each car sent to the front with rails was numbered with a consecutive or lot number & also marked with the initial station of any curved rails it carried, the first & last rail of each curve having the station painted on it. The cars of rails loaded for the front were trimmed with angle bars only. Spikes, bolts, tie-plates, etc., were loaded together in a separate car, which was used as a tool car as noted later.

The tracklaying train was made up for half a day's work as follows: (1) The pioneer car; (2) four cars of rails, carrying 1,000 ft. of track & anglebars, or about 22 tons; (3) the engine; (4) eight cars of ties carrying 250 to 270 ties each; (5) the tool car. A pushing engine was used at the rear when required. The anglebars & some bolts were transferred to the front end of the pioneer car, which carried a sort of apron provided for that purpose. The tracklaying force proper was distributed as follows: (1) The tie line stretcher, whose duty it was to keep the tie-line stretched 4 ft. from track centre stakes as a guide by which to line up the end of the ties; (2) eight or ten "tie buckers," who took the ties from the end of the tie tram or chute (which extended about 60 ft. beyond the pioneer), & dropped them approximately at the required spacing; (3) the tie marker, who marked ties where rails should lie across them, & kept the spacing pole moved up as required; this pole was a piece of band iron 30 ft. long, with a ring in the front end to pull it along, & having copper rivets at intervals to mark the proper spacing of the ties; it was placed just outside the tie line; (4) two men with "picaroons" lining the ties to the tie line, & at the same time squaring & spacing them according to the rivets in the pole. All this work was entirely ahead of the steel or rail gang & out of their way.

The steel gang consists of 8 "heelers" & 2 "strappers." The strapper puts a pair of angle bars on the last rail laid, & one bolt, not yet tightened. When the next rail came he opened the angle bar with his wrench to receive the rail end. The rail was "entered," the front end dropped & rail pushed back against the expansion shim, the bolt tightened up, & bolt struck and nut started for rail just laid. This is called the "slow-heel" method, but it is believed to be just as quick as, & to give a better chance to regulate the expansion, than the common method of throwing each rail back against the one laid. By the time the first bolt is tight the conductor signaled the engineman to move ahead, & the train advances a rail length. No spiking at all was done ahead of the train. The rails were held to gauge by bridle bars, 2 to a rail length on tangents, & 3 on sharp curves. These bridles were §-in. rods, flattened at the ends & turned back so that the rails were at proper gauge when the bridle was hooked under the base of the rails. There was a slot at the inside edge of the rail, through which a spike was stuck. The bridle was hooked under the line rail, a spike dropped in the slot, & the gauge rail thrown in so as to clear the turned over part of the bridle; the bridle being held up & the rail pushed out it hooked itself, & on the spike being dropped in it was secured. The bridles were put on by the "heelers," who generally got them before the "strappers" could fix their joint.

On the "pioneer car" there was the engineman for the stationary engine that ran the tram rollers, & one of the train crew to give signals to the locomotive engineman by means of whistle signals from the stationary engine. There were 3 men on the tie cars



GROUND FLOOR PLAN. MCADAM JUNCTION STATION, C.P.R.

throwing ties into the trams or chutes with "picaroons," 1 man on the tool car dropping off bolts & tie plates & 2 spike peddlers distributing spikes for each tie. The back gang consisted of 2 men lining, spacing & squaring any misplaced ties, taking off the bridles, & putting the tie-plates under the rails; 1 man picking up bridles & sending them to the front in a long narrow box over the tie trams; 4 or 6 gangs of spikers (each consisting of 2 spikers & a nipper), & finally 2 back bolters. This force would lay a pair of rails a minute, or sometimes a little better. It averaged 1,000 ft. of track an hour; & always had to lay the 4 cars of steel, besides putting up & taking down the tramways or chutes before stopping for dinner. They would do the same in the afternoon. The night crew did the switching at noon, making up the material train for the afternoon, & at night brought up the loads required for the next day. Ordinarily camp cars & stock of material were within 10 miles of the front. Ample motive power was necessary, so the train must be able to start quickly at each move. Two medium consolidated locomotives proved rather slow for handling the 14 loads on a grade of 22%. No cars without air brakes should be loaded for the front.

The "machine," by which is meant the train equipped with the appliances already mentioned, would work on curves of 14°, but not on a temporary curve of 22° on which it was tried. Mr. Dennis considers that the new "tie distributer" will work when it is made stronger, & then by having 2 gangs of heelers the machine will lay twice the amount of track, & the train need never come to a full stop. It is possible with iron cars or rail cars to put on enough men to lay more tracks by hand than with the machine, but this is more expensive, & it is very difficult to regulate the expansion, as one strapper will steal from the next one, & the rails are dropped so carelessly for long stretches that the bolts can hardly be got in. The gauging & spiking are also done hurriedly to let the train come up, & under this system, generally speaking, the track is dropped down rather than laid.

"**American Grain Elevators**" is a handsomely illustrated booklet giving the story of the grain elevator from its start, methods of construction, &c. It also contains illustrated descriptions of elevators built by John S. Metcalf Co., of 1075 West Fifteenth St., Chicago, Ill., including the G. T. R. elevator at Portland, Me., & the Canada Atlantic elevator, at Coteau Landing & Depot Harbor.

C.P.R. Projected Lines.

Following are the lines which the Co. has been authorized to build by legislation passed at the Dominion Parliament's last session:

From the Deloraine extension of the Souris branch, at or near Deloraine, to township 1 or 2, thence westerly for 100 miles. A portion of this, the Deloraine-Waskada branch, 18 miles, has been built this year.

From at or near Napinka on the Souris branch to a junction with the northwest extension of the Souris branch.

From the Manitoba South-Western Colonization Ry., between Manitou & Pilot Mound, to or near the international boundary. Part of this line, the Snowflake branch, 17½ miles long, has been built this year.

From the Souris branch between Lauder & Menteith, to between Glenboro & Treesbank on the Glenboro extension of the Souris branch.

From at or near Osborne on the Pembina Mountain branch, to the Manitoba South-Western Colonization Ry. between Cartwright & Boissevain.

From at or near Otterburne on the Emerson branch, to or near Stuartburn in township 2, range 6 east.

From at or near West Selkirk, northerly about 60 miles through ranges 3 or 4 east, to the west shore of Lake Winnipeg, thence direct northwesterly to the Little Saskatchewan River, distant not more than 6 miles from Lake Winnipeg.

From at or near New Westminster to Vancouver.

The Montreal, Ottawa, & Georgian Bay Canal Co.'s Act, assented to by the Governor-General recently, provides that the powers conferred on the Co. shall cease unless some of its canals are commenced by May 1, 1902, & $50,000 expended thereon, or if the canals are not completed by May 1, 1908.

Quebec Central.—Gross earnings for May, $44,332.09, against $41,661.85 in May, 1899. Working expenses, $29,772.76, against $26,263.75. Net earnings, $14,559.33, against $15,398.10. Gross earnings for June, $52,399.80, against $51,040.23 in June, 1899. Working expenses, $33,039.50, against $31,074. Net earnings, $19,360.30, against $19,966.23. Gross earnings, Jan. 1 to June 30, $235,686.77, against $218,558.29 for corresponding period of 1899. Working expenses, $164,273.13, against $149,210.20. Net earnings, $71,413.64, against $69,348.09.

RAILWAY DEVELOPMENT.

Projected Lines, Surveys, Constructions, Betterments, Etc.

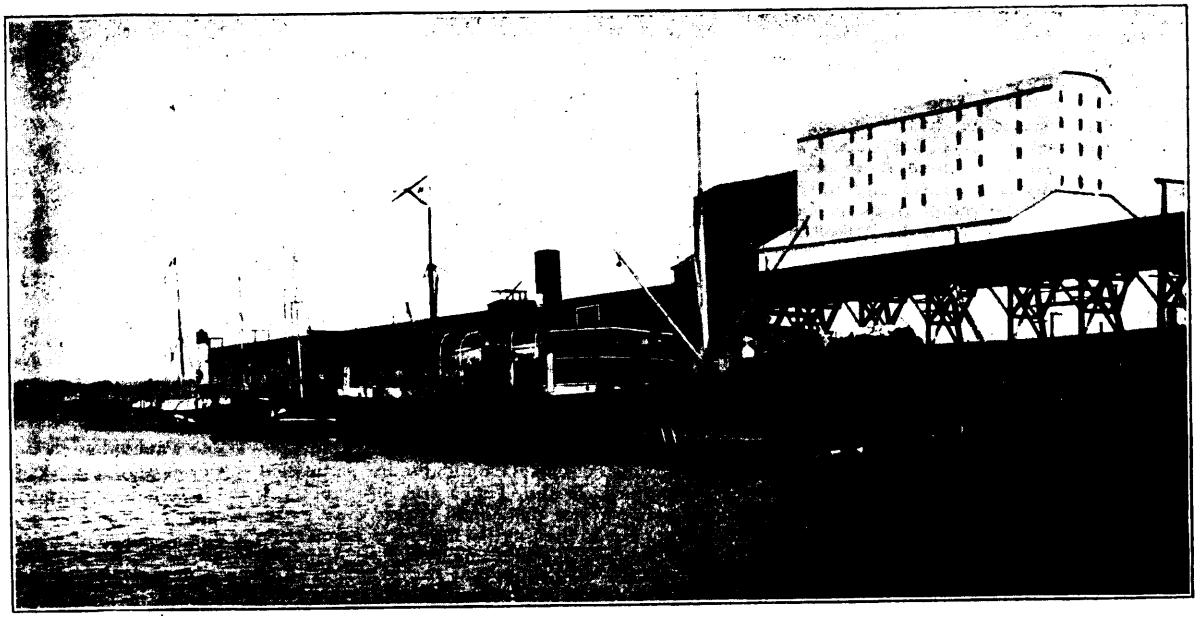
Alaska.—Railway building in the far north is one of the features of the rush to that country which began with the discovery of gold in the Klondike in the fall of 1896, followed by the discoveries at Nome, Koyukuk & other places in Alaska. The most northerly railways in the world will be the Nome & Port Safety road, & the line to the Wild Goose mining district from Nome, both of which are expected to be completed & in operation during the present summer. Next to these lines is the proposed line from Nome, or rather from the end of the Nome & Port Safety line, at Port Safety, to Katmai, around by the mainland & across the mouth of the Yukon river & through the Kushkequim country, reaching the coast at a point opposite Kodiak Island, which is open to navigation generally at all times of the year. This will put the Nome country in direct communication with the outside world.—Railway World.

The Alaska Exploration Co. is said to contemplate the construction of a railway to its coal mines, which are located on Coal Creek.

Alberta Ry. & Coal Co.—Some of the U.S. railway papers have stated that an extension is proposed from Lethbridge, Alta., north via Cardston to Swift Current, to connect with mines. This is ridiculously erroneous. Cardston is not north of Lethbridge, but southwest of it, while Swift Current is in the opposite direction on the main line of the C.P.R. The papers in question have probably got mixed up with the projected St. Mary's River Ry., reference to which will be found under that head further on.

Algoma Central.—The Dominion act incorporating this Co., passed in 1879, empowered it to build a railway from or near Sault Ste. Marie to the main line of the C.P.R., at or near Dalton, thence southwesterly to Michipicoton Harbor. An amendment was passed last session changing the route from Sault Ste. Marie to a point between Magpie & Michipicoton rivers, thence to the main line of the C.P.R., & southerly to Michipicoton Harbor.

The branch from Michipicoton Harbor, to connect with the main line between the Sault & the C.P.R. Co.'s transcontinental line, has been completed 12 miles to the Helen iron mine, has been inspected, & is now carrying passengers & freight. Some 250 men are at



CANADIAN PACIFIC RAILWAY ELEVATORS AND DOCKS AT ST. JOHN, N.B.

work at the mine, from which large shipments of iron ore are being made to Michipicoton Harbor, where the ore is shipped on the Co.'s steamers, 4 of which were recently brought out from England, & conveyed to Midland, Ont., for smelting. The ore dock at Michipicoton Harbor is 750 ft. long & 27 ft. wide at the bottom, 18 ft. wide at the top & 64 ft. high, running full length out into the bay. It supports 12 ore pockets, each of which holds one car load of 50 tons of ore. About 1,500,000 ft. of pine & spruce were used in its construction. The commercial dock, which is about 300 ft. from the ore dock, & parallel to it, is 300 ft. long & 40 ft. wide. Vessels drawing 20 ft. of water can tie up on either side of it. (June, pg. 174.)

Arthur White, Division Freight Agent of the C.P.R. at Toronto, who recently went over the branch from Michipicoton Harbor, said in an interview on his return :—"At the Helen mine he viewed with astonishment a mountain of almost pure brown hematite ore, which after careful tests by diamond drills is estimated to contain over 30,000,000 tons. The ore is being worked from the face of the mountain, the foot of which is almost on a level with the steel iron ore crusher now being placed in position for the purpose of crushing the ore, consequently the labor question is on the most economical basis, as, in the first place, the ore being so rich is dropped down the face of the mountain with very small blasts, & gravitation does nearly the whole of the business after that through the crusher & down the railway to the trestle works at the harbor, the line being on a grade down hill of 3 in 100, with only one exception, where it crosses the Magpie River, when the up grade for a short distance is against the traffic 1 in 100. The line is being equipped with 100-ton locomotives, & 50-ton capacity pressed steel cars for the ore. The ore in the first place has been disposed of to the new smelting works at Midland. Shipments will also be made to Hamilton & Deseronto, possibly to Montreal, &, in addition, largely to the U.S. After the Co. had got through with the testing of the Helen mine, water was required for the steam boiler in connection with the ore crusher, & a lateral shaft was run into a mountain about three times as large as Mount Royal at Montreal, but in place of getting water the officials were agreeably surprised to find a continuation of brown hematite ore, & they ran 2 lateral shafts into this second mountain a distance of 250 ft. each, & about 5 ft. square, finding nothing but a continuation of the best of brown hematite ore. The line from Michipicoton Harbor to the Helen mine is most picturesque, being a continuation of beautiful lakes, having outlets by falls similar to the one at Montmorency, & in addition to the beautiful scenery it runs through a virgin country for forest products. The streams are full of trout, catches of fish averaging from 20 to 24 in. long being the rule, & not the exception. It is the intention to erect a summer hotel. Villages have sprung up, principally populated by miners & railway employes, & there are now already permanently settled along the railway between 600 & 700 men, most of them in comfortable residences, & none under canvas, while less than a year ago the whole population of the district was represented by two Indian families."

The main line is also under construction from Sault Ste. Marie towards Missanabie, on the main line of the C.P.R., the first 20 miles being under contract to J. Conmee, & the next 50 miles to Fauquier Bros. Foley Bros. & Co., of St. Paul, Minn., are also said to have secured a contract for 100 miles. It is expected that 20 miles will be completed early in Sept. Large docks are being built at the Sault in connection with this line, as there will be extensive shipments of pulp-wood timber, etc., brought down. (June, pg. 174.)

Particulars of the aid given by the Ontario Legislature to this Co. appeared in our May issue, pg. 143. At its recent session the Dominion Government gave a cash subsidy of $160,000 for 25 miles on the branch from Michipicoton Harbor, & for 25 miles from Sault Ste. Marie towards the main line of the C.P.R., 50 miles in all.

It is said the Co. has secured running rights over the C.P.R. bridge across the St. Mary's River at Sault St. Marie, which will enable it to reach Sault Ste. Marie, Mich., & run into that city over the line of the Michigan Lake Superior Power Co.

The ratepayers of Sault Ste. Marie, Ont., by a vote of 412 for & 19 against, recently carried a by-law granting concessions to the Co.

The Co. is seeking to prevent F. Ferry & Co., lumbermen, from crossing its line by a short railway to get their lumber out.

See also under heads "Manitoulin & North Shore Ry.", & "Ontario, Hudson's Bay & Western Rys. Co."

Arthabaskaville.—The Dominion Parliament at its recent session granted a subsidy of $38,400 for 12 miles of this line from Victoriaville to Chester West, Que.

Atlantic & Lake Superior.—C. N. Armstrong, the promoter, is credited with saying that arrangements had been made between the shareholders & the bondholders by which the latter were given control of the road for the purpose of completing it, & that a representative of the bondholders was making arrangements for the immediate prosecution of the work by C. R. Scoles, of New Carlisle, as contractor. Joaquim Galindez, of London, Eng., was in Canada in July, & stated that after inspecting the line & interviewing interested parties, he had taken over the Baie des Chaleurs section on behalf of the bondholders' trustees, & that the uncompleted section to Paspebiac would be finished. Hon. Mr. Casgrain has been appointed to represent the bondholders in Canada. (Feb., pg. 41.)

A sheriff's sale of the line advertised for July 19 was postponed, C. N. Armstrong having filed two oppositions.

Bay of Quinte.—At the last session of the Dominion Parliament an act was passed extending the time for the completion of this railway for 5 years from the passing of the act. The Co. was also given extensive powers in regard to carrying on the business of generating & distributing electric power & energy & other motive power, also in regard to carrying on mining & timber business, & to deal in letters patent, franchises or patent rights. The bill as originally introduced met with some opposition in regard to the place & date of holding annual meetings. The head office was fixed at Deseronto, the directors being given power to change it by by-law. The annual meeting is to be held on the second Monday in Sep. of each year.

Between Deseronto & Deseronto Jct., about 4 miles, 65-lbs. rails are being put down in place of 50-lbs ones.

Bout de L'Isle-Charlemagne Bridge.—At the recent session of the Dominion Parliament $150,000 was voted towards building a single track standard railway bridge with 2 roadways, 10 ft. wide, from Bout de L'Isle to Charlemagne. at the junction of the Ottawa & St. Lawrence rivers.

Bracebridge to Baysville.—At the last session of the Dominion Parliament, a cash subsidy of $48,000 was voted towards the construction of a railway from Bracebridge to or near Baysville, not exceeding 15 miles.

Brazil Lake to Kentville.—The Dominion Parliament last session voted a cash subsidy of $35,200, to build 11 miles of railway from Brazil Lake, on the Dominion Atlantic, to Kentville, N.S.

Bridgetown & Victoria Beach.—See Granville & Victoria Beach.

The Canada Eastern is being ballasted from Fredericton for 20 miles along the line. The bridge over the southwest Miramichi is being replaced by a substantial structure.

Carleton & Miramichi.—The Dominion Parliament last session voted a subsidy of $15,400 for a railway from Bristol on the C.P.R., southwesterly 17 miles. (May, pg. 143.)

Canadian Northern.—On the Ontario section ballasting has been completed on the first 40 miles west from Stanley Jct., & track is now being laid on the second 40 miles, on the whole of which grading has been completed. On a further section of 45 miles about 40% of the grading has been done, & it is expected to complete this & lay track on it this year, which will place the end of track at Karribus Creek, a few miles beyond the Atikokan iron range, a distance of 125 miles from Stanley Jct. & 140 miles from Port Arthur. The grading contractors are D. McGillivray & Co., J. A. McDonell, L. Madigan, J. R. Turnbull, Jas. Anderson, H. Mann & A. R. Mann. J. R. Turnbull also has the contract for bridging. He has completed the Kaministiquia truss bridge, & is now building the Mattawan truss bridge. About 1,000 men are at work. It is expected to complete the line to Rainy River next year. (June, pg. 174.)

Rainy River, which forms the International Boundary between Canada & the U.S., will be crossed at Cathcart's Point, a few hundred feet below the confluence of Baudette River with Rainy River, & about 30 miles from Lake of the Woods. The bridge will be about 1,000 ft. long. It will have 5 piers, the centre one supporting a swinging span of 360 ft., which will give 2 channel openings of 160 ft. each. The plans have been approved by the U.S. Secretary for War, & have been submitted to the authorities at Ottawa. (June, pg. 174.)

On the Minnesota section, running through that State, between the south-east corner of Manitoba & Rainy River, track has been laid to Warroad, 116 miles from St. Boniface, Man., grading from Warroad to Rainy River is being proceeded with, & it is expected the rails will reach the River during September. (June, pg. 174.)

On the Manitoba section the track was completed last year to 218 miles northwest of Gladstone Jct., & the line has been opened for traffic to Bowsman, 195 miles from Gladstone Jct. There is also a branch of about 23 miles from Sifton Jct. to Winnipegosis. The main line is now being rapidly pushed on towards the northwest angle of Manitoba, from which it will be extended to Prince Albert, Sask. It is expected to build about 150 miles this year. The Dominion Parliament, in 1899, voted $320,000 towards the construction of the line north of Swan River, towards Prince Albert, & last session made a further grant of $320,000 for another 100 miles, which will carry the line into Prince Albert, which place it is expected to reach next year. It is possible that some work may be done on the branch from the northwest angle of Manitoba towards the Great Saskatchewan River, en route to Hudson's Bay, but this does not seem to have been decided. About 1,000 men are at work. (June, pg. 175.)

On the Gilbert Plains branch, which leaves the main line 2 miles northwest of Dauphin, & 86 miles northwest of Gladstone Jct., 6 miles were built last year, & the remaining 19 miles will be built this year. The Manitoba Legislature has ratified the agreement between the Greenway Government & the Co. granting aid towards the construction of this branch. (Apl., pg. 111.)

The Victoria, B.C., Times recently stated that the money for the Canadian Northern Ry. from Lake Superior to the northern coast of British Columbia, with a branch line to Dawson, Yukon, had been subscribed in London, Eng. This is undoubtedly somewhat premature, & the Times has probably got mixed up about the bonds which the Co. recently put on the English market in connection with the building of a line from Port Arthur to the Saskatchewan river.

Central Ontario.—Grading & track laying have been completed on the 21-miles extension from 2½ miles east of Ormsby to 1½ miles north of Bancroft. Ballasting is being done as fast as possible, & it is expected the extension will be open for traffic early in Sept. (Mar., pg. 72.)

The directors have not come to any decision as to when further extension of the line to the Canada Atlantic, near Whitney, will be proceeded with. The Ontario Legislature has voted a subsidy of $3,000 a mile for 40 miles of the further extension, & the Dominion Parliament last session voted $64,000 for 20 miles of the same. (May, pg. 143.)

Central Vermont.—It is rumored that the Central Vermont Ry. Co. is trying to acquire the Orford Mountain Ry. from Eastman to Lawrencevile, Que., & that if it does a connecting link will be built between Waterloo, on the C.V. line & Lawrenceville, on the O.M. line.

The Dominion Parliament, at its last session, voted a subsidy of $67,200 for a railway from Farnham to Frelighsburg, Que., & the International Boundary Line, not exceeding 21 miles. The Montreal & Province line operated over a portion of this route some years ago. The Central Vermont is behind the project. (June, pg. 175.)

Chateauguay & Northern.—The Dominion Parliament, last session, voted a subsidy of $134,400 towards the construction of this line from Hochelaga Ward, Montreal, to the Great Northern Ry. in or near Joliette, passing near L'Assomption, Que., with a spur into that town, not exceeding 42 miles in all.

The Comox & Cape Scott Ry. Co. was incorporated at the Dominion Parliament last session, with power to build from Comox district, on or near the 50th parallel of latitude, on or near the east coast of Vancouver Island, through Sayward & Rupert Districts, to Cape Scott or some other point at or near the north end of Vancouver Island. The provisional directors are J. Dunsmuir, R. M. Jeffrey, J. A. Lindsay, L. H. Solly & H. K. Prior, of Victoria, where the head office is situated. Mr. Dunsmuir is Vice-President of the Esquimalt & Nanaimo Ry., which runs from Victoria to Wellington, 78 miles, & the proposed line would doubtless be a subsidiary of that Co. (April, pg. 111.)

Cowichan Valley.—The Dominion Parliament last session extended the time for the commencement of this railway until June 13, 1902, & for its completion to June 13, 1905. The Co. was incorporated in 1898, the incorporators being Hon. G. A. Cox & R. Macdonald, Toronto; P. Long-Innis, New York; H. J. Wickham, Toronto; M. M., W. T. C., & H. Boyd, Bobcaygeon; J. G. Edwards & J. D. Flavelle, Lindsay. The Co. is empowered to build a line from or near the mouth of the Cowichan River, Vancouver Island, following the valley of that river & Cowichan Lake to or near the head of Cowichan Lake, thence following the Franklin River to the Alberni Canal, at or near the mouth of the Fraser River, with a branch following the Nitinat River & Nitinat Lake to or near the outlet of Nitinat Lake.

Edmonton, Yukon & Pacific.—Mackenzie, Mann & Co. are said to have an option on this charter, but as far as we can ascertain it has not been transferred to them. (Apl., pg. 112.)

Gaspe Short Line.—The bill to incorporate this Co. passed the House of Commons last session, but was rejected by the Senate on the ground that it contained provisions that were not in the petition. (Apl., pg. 112.)

Golden Lake to Bancroft.—The Dominion Parliament last session voted $64,000 towards building 20 miles of railway from the Pembroke Southern Ry., at or near Golden Lake, towards the Irondale, Bancroft & Ottawa Ry. at or near Bancroft, for the further extension westerly from the western terminus of the 20 miles granted in 1897.

Grand Forks & Kettle River.—The Kettle River Valley Ry. scheme, which was rejected by the Railway Committee of the House of Commons last session, has come up in a new form, a bill having been introduced in the B.C. Legislature to incorporate Hon. J. R. Stratton, T. P. Coffee & F. M. Holland, of Toronto; G. H. Cowan, A. J. Kappelle & A. McEvoy, of Vancouver, as the G.F. & K.R. Ry. Co., with power to build a line from the Canadian side of the International Boundary at or near Cascade City along the westerly side of Kettle River to Carson on the same side of the boundary, & with power to build branch lines, etc.

Granville & Victoria Beach.—The Dominion Parliament last session voted a subsidy of $96,000 towards the construction of 30 miles of railway from Bridgetown to Victoria Beach, N.S. (Oct., '99, pg. 294.)

The Great Northern of Canada has been constructed from Riviere a Pierre, on the Quebec & Lake St. John Ry., to a connection with the Canada Atlantic Ry. at Hawkesbury, 172½ miles; branch to Shawinigan, 4½ miles; total constructed road, 177 miles. The line is all completed, except the bridge across the Ottawa River at Hawkesbury, which will, it is said, be finished, & the through line opened in September. The Lower Laurentian Ry., 39½ miles, has been purchased by, & forms a part of the G. N. Ry. One hundred miles of the latter's track is laid with 70 lbs. steel rails, & the remainder with 56 lbs. rails. The Co has contracts running for 20 years with the Canada Atlantic & the Quebec & Lake St. John for interchange of traffic on a mileage basis. Under the charter of the Chateauguay & Northern Ry. the G.N.R. will build a line between Joliette & Montreal. It will be 36 miles long & will, it is said, be completed next spring, giving the G.N.R. direct entrance to Montreal where it will have its own terminals. (June, pg. 175.)

The Dominion Parliament last session voted $64,000 towards building a branch not exceeding 20 miles, from or near Joliette towards Ste. Emilie, touching the parishes of Ste. Beatrix & St. Jean de Matha.

Great Northern (U.S.A.)—J. N. Hill, son of President Hill, is at the head of the Dakota & Great Northern Ry. Co., recently incorporated under the laws of North Dakota, with a capital stock of $2,500,000, to build a line from near Lakota, on the main line of the G.N. northerly through several productive counties to near the International Boundary Line. This line will probably run between the G.N. branches which now terminate at Hannah, N.D., south of La Riviere, Man., & St. John, N.D., south of Killarney, Man.

The largest railway tunnel in the world is nearly completed through the Cascade Mountains, west of Kalispel, Mont. It is the pet scheme of President Hill, & will save the G.N. 12 miles & several hours in the transcontinental run. It will give it a shorter time from the Mississippi & Lake Superior to the Pacific than the Northern Pacific can make. By next Jan. G. N. trains will be passing under the Cascades instead of winding & backing over them. There are now 7 switchbacks over the mountains which the tunnel will wipe out. Eight years ago Mr. Hill put engineers in the field for the final reconnoissance of this tunnel. When he announced his plan many railway men laughed, & said it would bankrupt the road. It is, however, being built almost entirely from the surplus revenues of the road, largely from those of the Montana Central branch. The work since Jan. 1, 1897, has been entirely paid for by earnings above dividends. More than 2 miles is completed, & 1-3 of a mile remains. Almost 1,000 men are at work with the latest & most powerful appliances. The sum paid for labor to date is nearly $3,000,000, & the tunnel will cost more than $4,000,000. Aside from the time & distance saved the tunnel will avoid the difficulty of keeping open for more than 7 months of each year passes where snow often falls to an extraordinary depth. Transcontinental freight will be carried more cheaply, & it is to transcontinental freight destined for the Orient that Mr. Hill looks for the future of his system. He is shaping his affairs to the end that he can carry freight from any part of the eastern U.S. to the Orient at the lowest possible cost, & he is quoted as saying recently, when coming back after an inspection of the tunnel, that in 10 years the traffic for China would require a double track from Duluth to Seattle. His road is now receiving steel rails & other export goods taken by rail from the Atlantic tide-water to the lakes at Buffalo, & thence by his ships to Duluth, consigned for Honolulu & Nagasaki. With the construction of the freighters building at New London, Conn., & new & larger freighters for the lakes, together with the new tunnel, a still lower rate will be made. The new lake freight ships will soon be built. (May, pg. 143.)

A recent press report credits this Co. with the intention of building a line to Phœnix, B.C., to connect with the Greenwood & Phœnix Tramway Co.'s proposed line from Greenwood.

President Hill is credited with stating that he will not build a branch into the mining camp at Republic, Wash., this year, as was his intention, as the outlook is such as to render it necessary for the Co. to cut down expenditures.

Haliburton towards Mattawa.—The Dominion Parliament last session voted $128,000 towards the construction of a line from Haliburton via Whitney, towards Mattawa.

The Halifax & Yarmouth has 50 miles in operation between Halifax & Barrington Passage. The second lift of ballast has been put on the section between East Pubnico & Barrington Passage, opened Jan. 15 last, thus completing the road in accordance with the requirements of the Government specifications. Location surveys are in progress between Barrington Passage & Shelburne, 26 miles. Some little work was done on this section last year, a portion of the clearing, about a mile of grading & fencing & some of the masonry being completed. In regard to the rumor that the H. & Y.R. Co. was likely to be amalgamated with the Dominion Atlantic, we are authorized to say that the matter has never been considered in any way by any of the directors or stockholders of the H. & Y. Co. (Apl., pg. 112.)

Halifax Towards Central Ry. of N.S.—The Dominion Parliament last session voted $64,000 towards the construction of a railway from Halifax towards the Central Ry. of N.S. in the county of Lunenburg. This is in addition to & in extension of 20 miles subsidized in 1899.

Intercolonial.—The Dominion Parliament last session voted the following amounts chargeable to capital, for betterments, etc., in addition to other amounts voted for equipment:

Increased accommodation at Halifax	$ 5,000 00
Increased facilities along line	60,000 00
Snow fences	5,000 00
Dredging at Pictou Landing	2,550 00
Sidings	12,500 00
Grain elevator at St. John	32,000 00
Grain elevator at Halifax	21,500 00
Equipment of stations, etc	6,300 00
Building for baggage & express at Truro	2,000 00
To extend dyke at Lepers' Brook, Truro	300 00
Iron highway bridge, Rocky Lake	5,000 00
Additional houses for engines	80,000 00
Balance due on Halifax cotton factory br'ch.	5,802 00
Freight shed & to improve station at Rockingham	1,800 00
To extend cotton factory branch at Halifax	70,000 00
To extend coal trestle at Stellarton	3,500 00
To increase station accommodation at Westville	8,000 00
To increase accommodation at Sydney	39,000 00
Sidings at Stellarton, near Albion Mines	2,500 00
To re-arrange, enlarge & extend station yard at Truro	9,500 00
To increase accommodation at Halifax	16,200 00
Improvements at Mulgrave	25,000 00
To complete subway at Christy's Brook, Amherst	1,800 00
To increase accommodation at Amherst	3,500 00
Original construction	2,000 00
Land damages on Oxford, New Glasgow & Cape Breton divisions	2,000 00
To strengthen bridges	100,000 00
Improved accommodation & facilities along the line of railway	104,000 00
To increase facilities along the line	112,800 00
To increase accommodation at Levis	110,000 00
Additional sidings along line	105,500 00
Three travelling steam derricks	30,000 00
New steel bridge at Etchemin—additional cost	22,000 00
To increase accommodation at St. John	203,000 00
To dredge & blast rock at Halifax	11,000 00
To raise Sydney & Louisburg Ry. bridge	3,300 00
To improve ferry service at Strait of Canso	250,000 00
To extend I.C.R. to Copper Crown Works, Pictou	20,000 00
Rolling stock	400,000 00
Steel rails & fastenings	420,000 00
Grain elevator at St. John	2,000 00
Towards strengthening iron bridge	80,000 00
Building new & enlarging old engine houses	60,000 00
Improvements at Point Tupper	7,000 00
Towards building sea wall in Cape Breton	8,000 00
Larger turntables	11,000 00
Improvements at Mulgrave	10,000 00
Towards constructing subway at Christie's Crossing	3,500 00
Improving telegraph service	12,000 00
Towards building rest houses at engine stations	3,000 00
Drop pits	5,000 00

Hon. R. R. Dobell has notified the Mayor of Levis that the proposed improvements there will soon be begun, including a new station & new wharves, involving an expenditure of about $300,000. It is said the old station will be used as a customs house & post office. (June, pg. 175).

The third floor of the office building at Moncton, heretofore used principally as store rooms, has been fitted up for offices, & is being occupied by the audit, freight claims, advertising & maintenance of way departments.

An official is reported to have stated that 10,000 tons of 80 lbs. rails have been ordered in the U.S. to relay track in Cape Breton.

Additional land has been secured at Sydney, N.S., & will be used for tracks & freight sheds necessitated by the growing business at that place.

I.C.R. Pictou Branch to Kempton.—The Dominion Parliament last session voted $14,400 towards constructing 4½ miles of railway from the I.C.R. Pictou branch to Kempton, N.S.

Interprovincial Bridge, Ottawa & Hull.—Work is proceeding rapidly on the superstructure, & it is hoped to have the bridge completed in Oct. or Nov. (July, pg. 195).

The Dominion Parliament last session voted $100,000, in addition to $112,500 previously granted, towards the construction of this bridge, on condition that it provide suitable facilities, to the satisfaction of the Minister of Railways, for vehicular & foot traffic the same as upon a public highway.

Inverness & Richmond.—Track was laid last year 30 miles from Port Hastings to 2 miles beyond Port Hood. On the second section of 30 miles to Broad Cove, about 75% of the grading has been completed, & track laying is going on with the intention of completing that section this year. It is probable that grading will be gone on with beyond Broad Cove towards Cheticamp, which is 110 miles from Port Hastings, the Dominion Parliament last session having voted $128,000 towards the construction of 40 miles from Broad Cove towards Cheticamp. About 800 men are at work. (June, pg. 175).

Station buildings have been decided on for the following points: Port Hastings, Port Hood, Mabou, Broad Cove, Cregnish, Judique, Glencoe, Strathlorne, Long Point, Catherine's Pond & Glendyer. Enameled iron plates with white letters & dark blue ground, supplied by the Acton Burrows Co., Toronto, have been adopted as the standard for station names on this line instead of painted wooden signs.

Irondale, Bancroft & Ottawa Jct. to Minden.—The Dominion Parliament at its last session voted $38,400 towards the construction of 12 miles of railway, from or near the junction of the I. B. & O.R. & the G.T.R. to Minden.

Kingston & Pembroke.—The Dominion Parliament last session voted $38,400 towards constructing a branch of this line for 12 miles to iron mines in Bedford township.

Kootenay Ry. & Navigation Co.—Ballasting is proceeding on the line between Kuskanook, B.C., & Bonners Ferry, Idaho, but no announcement has been made as to when it will be open for traffic. (Apl., pg. 114).

No further progress has been made with constructing the Kaslo & Lardo-Duncan branch, the grading of which was nearly completed last year from Argenta to Duncan City, B.C. The unsettled condition of the mining industry, etc., brought about largely by injudicious provincial legislation, has retarded the development of the district. Last session the Dominion Parliament voted $96,000 towards constructing 30 miles of this branch from Duncan Lake towards Lardo or Arrow Lake, or from Lardo to Arrow Lake. (June, pg. 175).

Lake Erie & Detroit River.—The plans for the extension from Ridgetown to St. Thomas were approved June 23, & construction will soon be commenced. (June, pg. 175).

Lindsay, Bobcaygeon & Pontypool.—A meeting of the shareholders is to be held Aug. 27, to elect directors, after which the organization of the Co. will be completed. It is said that the survey will be started as soon after as possible & that construction is likely to go on this year. The name of W. T. Jennings, C.E., of Toronto, is mentioned in connection with the survey. The line is projected to run from Burketon, on the Montreal-Toronto line of the C.P.R., to Lindsay. (Mar., pg. 77.)

Lockeport to Sable River, N.S.—The Dominion Parliament last session voted $64,000 towards constructing 20 miles of railway from Lockeport to Sable River, or some other convenient point of railway connection.

London & Port Stanley.—Mayor Rumball, of London, is endeavoring to secure the extension of this line so as to serve the factories in the east end of London & to connect with the C.P.R.

Lynn Canal Shore Line.—Articles of incorporation of this Co. have been filed. Its object is to construct a railway from the mouth of Skagway River, on Lynn Canal, near Skagway, to or near the mouth of Dyea River, near Dyea. The capital stock is $100,000 & the principal office is at Seattle, Wash.

Manitoba & Lake Superior.—Articles of incorporation have been filed at Duluth for a company under this name to build a railway & telegraph line from Duluth to the International Boundary between Manitoba & Minnesota. J. T. Rose, Northwestern Agent of the Canada Atlantic at Duluth, is one of the incorporators.

Manitoulin & North Shore.—At the last session of the Dominion Parliament an act was passed to incorporate a railway company under this name, the incorporators being J. McKay, R. A. Lyon, W. H. Hearst, & W. Brown, of Sault Ste. Marie, J. Cleland, of Meaford, T. J. Ryan, of Sudbury, T. C. Sims, of Little Current, & A. G. McKay, of Owen Sound. The Co. is empowered to construct a standard gauge railway from or near Little Current, Manitoulin District, northerly & easterly 100 miles to cross the main line of the C.P.R. at or near Onaping or Cartier stations, & also from or near the township of Drury or Hyman, on the above mentioned line easterly to Sudbury, & from or near Little Current southeasterly to the south shore of Manitoulin Island or Fitzwilliam Island, & from or near Tobermory, Bruce County, via Wiarton & Owen Sound to Meaford. This charter has been acquired by the owners of the Algoma Central Ry. charter. The approximate length of the lines between Sudbury & Manitoulin Island is 66 miles, 12 miles are already under contract to Fauquier Bros., from Sudbury to the Gertrude mine, a very rich nickel mine, which will be opened up as soon as possible & the ore shipped to the reduction works at Sault Ste. Marie. T. J. Kennedy, Genl. Superintendent of the Algoma Central Ry., has charge of this line also.

At the last session of the Dominion Parliament a cash subsidy of $211,200 was voted for 66 miles of this line between Little Current, Manitoulin Island & Sudbury, the Co. undertaking to bridge between Little Current & the mainland, the bridge to be so constructed & maintained as to afford suitable facilities, in the opinion of the Minister of Railways & Canals, for free vehicular traffic, the same as upon a public highway, the work to be begun & prosecuted from Little Current & Sudbury, one-half of the subsidy to be applicable, as earned, in respect of the work beginning at Little Current & carried on towards Sudbury, & one-half to be applicable, as earned, in respect of the work beginning at Sudbury & carried on towards Little Current, the railway to cross the Sault Ste. Marie branch of the C.P.R.

Michigan Central.—Eighty pounds steel rails are being laid between Welland & Cayuga, which will complete the laying of the Canadian division with heavy steel.

It is said the Co. will build an iron bridge at London st., Windsor, Ont.

Midland of N.S.—It is expected that the bridge over the Shubenacadie river will be completed about Nov. or Dec., which will enable the line to be opened for traffic. (Apl., pg. 114.)

Moncton & Buctouche.—Considerable work has been done this season strengthening & renewing bridges.

Montford & Gatineau Colonization.—The Dominion Parliament last session voted $96,000 towards constructing 30 miles of this line from Arundel to Preston township near Hartwell, Que. It also empowered the Co. to extend its railway from its present terminus near St. Sauveur to the Great Northern Ry. near St. Canut, thence to a junction with the Jacques Cartier Union Ry. near Montreal.

Morris & Portage.—The Dominion Parliament last session incoroprated a Co. under this name with power to build a railway from or near Morris, or from or near Union Point, to Portage la Prairie, Man. The incorporators are: F. M. Bell, Morris; T. H. & C. Metcalfe, Portage la Prairie; J. R. Grant, H. E. Sharpe & W. A. Cavanaugh, Winnipeg.

Nicolet River Bridge. The Dominion Parliament last session revoted $15,000 towards constructing a railway bridge over the Nicolet river at Nicolet, in lieu of the grant made in 1899.

Nipissing & James' Bay.—Early in July the Secretary notified the Mayor of Parry Sound that the Co. would construct about 5 miles of the line, so as to connect the Canada Atlantic Ry. with the town of Parry Sound, in consideration of a cash subsidy of $20,000, of free right of way through streets & property owned by the town, of a grant of waterfront property & property adjacent thereto owned by the town & of exemption from taxation for 20 years. A by-law granting $20,000 to the Co. was carried by a majority of 185 ratepayers on Aug. 7. It is said the other concessions asked will be arranged by the Council. (Dec. '99, pg. 352.)

The Dominion Parliament last session extended the time for the commencement of this Co.'s railway to Lake Tamagaming until July

9, 1901, & further extended the time for the completion of the line.

The Dominion Parliament last session revoted $64,000 towards constructing 20 miles of this line from or near North Bay, on the C.P.R., towards James' Bay or Lake Tamagaming.

The Dominion Parliament last session voted $112,000 towards constructing 35 miles of railway from a point northerly 20 miles from Parry Sound to the French River.

Northern Pacific.—President Mellen, when in Winnipeg at the end of July, said there was no likelihood of the Manitoba hotel being rebuilt this year, but that the question of rebuilding was still under consideration.

The branch from Portage la Prairie to Oakland, 9 miles, built last year, is being extended some 4 or 5 miles to Lake Manitoba. A 700 ft. pier will be built at the lake, which will give a depth of 12 ft. of water for vessels. (Apl., pg. 115.)

The Co. has built a short spur line connecting its Morris-Brandon branch with the exhibition grounds at Brandon.

Contractor J. D. McArthur is reported to be building an extension of the Souris branch from Trackend to Hartney, about 5 miles. (May '99, pg. 136.)

Norwood to Apsley.—When a delegation from Peterboro County, Ont., interviewed President Shaughnessy, of the C.P.R., in regard to the construction of a branch from Norwood, on the Montreal-Toronto line, 18 miles east of Peterboro, to Apsley, in the northern part of the county, some 25 miles, in April last, he recommended the formation of a local company & the obtaining of a charter, & said that if the usual Government subsidies were secured the C.P.R. would arrange to build the line & operate it. We are informed that the suggestion is about to be acted upon, that an application for a charter will be made at the next meeting of the Ontario Legislature, & that the usual subsidies will be asked for. J. B. Pearce, of Norwood, is one of the principal promoters. (May, pg. 140.)

The Nova Scotia Steel Co. is reported to have decided to build a railway from North Sydney, N.S., to Point Aconi through the heart of the coal deposits it has purchased from the General Mining Association.

Ontario, Hudson's Bay & Western Railways Co.—In 1890 the Dominion Parliament incorporated the Sault Ste. Marie & Hudson's Bay Ry. Co., the provisional directors being J. Cozens, R. D. Perry, J. G. Stradley, T. W. Burdick, J. H. Steere, J. A. McDonald, W. McK. Bell, W. McK. Simpson & J. McKay, with head office at Sault Ste. Marie. The Co. was empowered to build a standard gauge railway from or near Sault Ste. Marie to the main line of the C.P.R. between Dalton & Ridout stations, thence northerly & easterly to or near Moose Factory, James Bay. The name was subsequently changed to the Ontario, Hudson's Bay & Western Rys. Co. The charter is said to have been secured in the interest of the Algoma Central Ry., & it is said that it will be made use of to extend the A. C. main line from Missinabie to Hudson's Bay.

Ottawa & New York.—A Cornwall despatch of Aug. 3 said: It is expected the work on the bridges across the north & south channels of the St. Lawrence at Cornwall will be completed & the structures ready for traffic by Sept. 15. The shore span in the south channel, which was swung about two weeks ago, is all riveted up, the false work & piles removed, & the water under it clear. The strength of the current rendered it inadvisable to use wooden piles to support the false work of the centre span, & 24 steel piles were secured. They are 50 to 60 ft. long, of 15 in. channel steel, connected by lattice work, & most of them have been driven. The erection of the false work is close behind the pile driving, & early next week will be ready for the erection of the middle span. In the north channel the foundation of pier 8 at the toe of the canal bank is finished & 8 courses of masonry laid. The steel caisson around pier 7 is resting on the rip-rap at the bottom of the river. This material, which was dumped in after the accident two years ago, has been mostly removed, & the caisson rests about on the original bed of the river. The entire steel work is under water, only a timber extension which will afterwards be removed showing. The caisson will be filled with concrete & laid to the original foundation with wire ropes embedded in concrete.

The Dominion Parliament last session voted $90,000 towards the construction of the Canadian portion of the Cornwall bridge.

The N.Y. & Ottawa Ry. Co., an allied Co. of the O. & N.Y.R., recently brought suit against the Collins Bay Rafting & Forwarding Co., to recover damages upon a contract between the parties & for other relief. The contract was for the removal of two wrecked spans of bridge in the south channel of the River St. Lawrence south of the International Boundary. The case was tried at Cornwall, Judge Street delivering judgment, declaring that defendant had duly prosecuted its work without breach & was entitled to $5,000 of the contract price for removing the southern span of the bridge, & $5,000 more for putting it on the shore, & dismissing action with costs without prejudice to plaintiff's right, if so advised, to bring any further action or actions for any other or later breaches of the contract. Judgment was given for defendant on its counterclaim for $5,000 (in addition to the $5,000 already paid it) & counterclaim dismissed without costs as to balance claimed without prejudice to its right to recover in any future action the balance of the contract price if it showed itself entitled on the ground of completion of contract or any other grounds save those in paragraphs 8. 9 & 12 of defence & counterclaim. Stay until Oct. next.

After several months of negotiation the O. & N. Y. R. is said to have concluded the purchase of property for its freight terminus in Ottawa. Owing to the fact that approaches could not be secured to the terminal property originally purchased adjacent to the Central station, it became necessary to secure a new location. The Co. will now proceed with the erection of such buildings as may be necessary for the carrying on of its freight traffic. It is expected that the car shops will be erected within the city limits between now & autumn, when the works will be removed from Santa Clara, N.Y.

Ottawa, Brockville & St. Lawrence.—The Dominion Parliament last session incorporated a railway company under this name, with power to build a railway from or near Ottawa through the counties of Carleton, Grenville & Leeds, to or near Brockville, but not to build or operate a street railway in Ottawa or Hintonburg or to build or operate a railway within a mile of the Ottawa Electric Ry. at Britannia. The Co. is given powers to generate & distribute electrical power & energy, & to operate a ferry from Brockville across the St. Lawrence to Morristown, N.Y. The incorporators are A. McLean, J. Straton, G. E. Kidd, & C. W. F. Gorrell, of Ottawa; D. Derbyshire & D. Downey, of Brockville; A. E. Baker, R. W. Watchorn & G. B. McGee, of Merrickville. The capital stock is to be $500,000, & the Co. may issue bonds, etc., for $25,000 a mile.

Parry Sound Northerly.—The Dominion Parliament last session voted $112,000 towards constructing 35 miles of railway from a point northerly 20 miles from Parry Sound to the French River.

Port Arthur, Duluth & Western.—Considerable alterations will be made in the terminal yards at Port Arthur before winter sets in. A good deal of work is being done on the line putting in ties & fixing up the track generally so as to have it in shape for the winter work.

Prince Edward Island.—Contractor McManus, of Memramcook, N.B., having become mentally disqualified, the contract given him for building 11½ miles of the branch from Charlottetown towards Murray Harbor was cancelled & given to W. Kitchen, of Fredericton, N.B., who purchased Mr. McManus' outfit, timber, etc., & started work June 19. The contract starts at Mutch's Point, at the Southport end of the bridge to be built from Charlottetown over the Hillsborough River. Along the 11½ miles of line are 8 chains of bogland & 41 acres of woods. The grading will be easy, most of the soil being sandy loam. The deepest cutting will be 9 ft., the deepest fill 20 ft., & the highest dump 10 ft. There will be 11 public road crossings & 35 culverts, ranging from 2½ x 2½ ft. to 6 x 8 ft. The maximum gradient will be 1¼%, considerably less than that of the main line. Two-thirds of the 11½ miles will be tangents. The maximum curvature will be 6° as compared with 10° on the main line & the average curvature will be about 3½°. The width of the right of way is 99 ft., that of the main line being only 66. The width of grade on top will be 16 ft., against 14 on the main line. (June, pg. 176.)

The Dominion Parliament last session voted $700,000 for the construction of this branch, including the Hillsborough River bridge.

Under an agreement between the Dominion Government & the Province of P.E.I. ratified at the Dominion Parliament's last session, the Dominion Government undertakes to build a railway & highway bridge over the Hillsborough River from the shipyard in Charlottetown to Mutch's Point on the Southport side. The Province is to pay the Dominion $9,750 a year towards the interest on the cost & maintenance of the bridge, instead of $12,000 a year as originally agreed on, & is to keep the flooring of the highway portion of the bridge in repair, also to light the highway portion, the Dominion maintaining the rest of the bridge. The Province is to have the exclusive right to levy tolls on the bridge, except for railway traffic & railway employes.

The specifications issued for the substructure of the bridge call for 11 stone & concrete piers, 4 of which & possibly 5 are to be founded on bed rock by the pneumatic process, the others to have pile foundations. The masonry is to be ranged rock work of the best description in regular courses. From 4 ft. below low water to the top the best hard, fine, bluish grey Wallace sandstone is to be used. (June, pg. 176.)

In addition to the amount above mentioned for the Murray Harbor branch & bridge, the Dominion Parliament last session voted $710, chargeable to capital account, for increasing the accommodation at Summerside, & $3,000 to shorten the main line by removing curves. It is said that the latter amount will be spent on the western end of the line & that W. Kitchen, of Fredericton, N.B., has been given the contract.

Quebec Bridge.—The contractors, Davis & Son, have 150 men at work, & expect to have 400 by Sept. It is the intention to have the two anchor piers finished before cold weather arrives. The bridge will stretch from a point just south of the Chaudière on the south side of the river, to Cap Rouge on the north side. Granite quarries at Rivière à Piere, on the Lake St. John Ry., 60 miles from Quebec, have been secured. The quantity of masonry is estimated at 50,000 cubic yards, 5,000 of which will be finished when work is closed down about Nov. 15. Besides the two abutments—one on the Quebec, and the other on

the Lévis side—there will be two anchor piers & two great river piers, the latter supporting a span of 1,800 ft., said to be the longest ever designed. The cantilever span on the Forth bridge is 1,710 ft., 90 short of the St. Lawrence bridge's central span. From each abutment to its neighboring pier the distance is 400 ft., & the anchor spans are 500 ft. each. Thus the total length of the bridge from abutment to abutment is to be 3,600 ft., rather more than two-thirds of a mile. Though the anchor piers are to be completed this autumn, it is expected that two seasons will be required for the building of the monster piles known as the river piers. The contractors have until Oct., 1902, in which to get the substructure built. Next May one of the inner piers is to be commenced. Pneumatic caissons 168x50 ft. & 50 ft. high, are to be built this winter, to be launched when required. The contractors' engineer is A. A. Stewart, of New York. The steel superstructure will weigh about 40,000 tons. Single pieces will leave the shop weighing as much as 110 tons. The bridge is to have a double track, & the engineers claim that it will bear the weight of as many 150-ton locomotives as can be crowded on both tracks. There will also be a double track tramway & a double track carriage way. (June, pg. 176.)

Restigouche & Western.—The Dominion Parliament last session voted $96,000 towards building 30 miles of this line, in addition to the 15 miles subsidized by 62-63 Vic., chap. 7, on the easterly section of the line, & in continuation from the westerly end of that 15 miles, a further 15 miles towards the St. John River, & in addition to the 12 miles subsidized by the said chapter on the westerly section of the line, a further distance from the easterly end thereof of 15 miles, towards Campbellton, N.B., not exceeding 30 miles. (April, pg. 116.)

The Dominion Parliament last session passed an act authorizing this Co. to construct a railway bridge across the St. John River, from the western terminus of the railway which the New Brunswick Legislature authorized it to construct on the east side of the river between Grand Falls & Madawaska, N.B. Should the site selected for the bridge be such that its western terminus will be in Maine, the Co. is not to commence erection until the U.S. Congress or the Maine Legislature has approved of the bridging of the river.

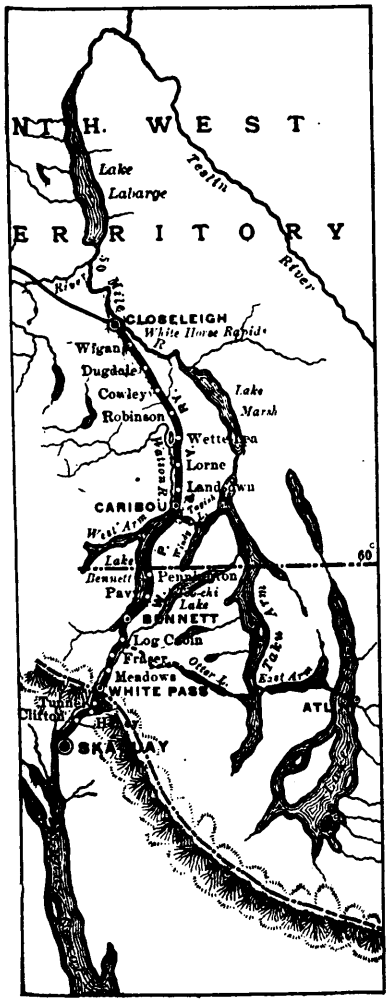
Rutland.—The northern end of this line from Burlington, Vt., to Rouse's Point is so far completed that freight trains are operating over it. It is expected it will be completed early in Sept. (June, pg. 176.)

Toronto, Hamilton & Buffalo.—The grading of the spur line of 4 miles in Hamilton has been completed, & the pile driving & upper work for the bridges has been done. Some delay has occurred at the G.T.R. under crossing which is a separate contract. An interlocking switch is being placed at the crossing with the N. & N.W. division of the G.T.R. It is said the construction will average about $25,000 a mile. (May, pg. 145.)

White Pass & Yukon.—The portion of this line between Caribou & Whitehorse has been completed. The route is shown on the accompanying map. The route from Lake Bennett lies along the east shore of Lake Bennett to Caribou, 27 miles beyond Bennett, thence up the valley of the Watson River & along Lewis Lake, striking the Lewes River in the Miles canyon, 39 miles beyond Caribou, or 112 miles from Skagway. On the map the name "Closeleigh" has been given to the town site of Whitehorse, but the name has recently been

changed to Whitehorse. The distance from Whitehorse to Ft. Selkirk, at the junction of the Lewes & Pelly Rivers, where the Yukon is formed, is 200 miles, & the distance from Whitehorse to Dawson by river, is 450 miles. The road was completed into Whitehorse, from Caribou, on June 7, the first train entering the town on that date, but owing to the rough country encountered along the shore of Lake Bennett the line between Bennett & Caribou was somewhat delayed. Traffic is being maintained between Bennett & Caribou by steamers. One thousand men were engaged in grading the roadbed & laying track between Bennett & Caribou, & at the date of our last advices it was expected the line would be completed early in Aug. (A later telegram says this has been done.)

The following information regarding the line from Bennett to Whitehorse has been furnished by General Manager E. C. Hawkins:



"The first 12 miles beyond Bennett is very heavy rock work, precipitous mountain peaks running directly into the deep water of the lake. The other 15 miles of the 27 are along ordinary mountainside, & are of more easy or average construction. At the north end of Lake Bennett, at what is known as Caribou Crossing, a bridge about 500 ft. long will be put in, with a draw span, so as not to interfere with the navigation of the lakes & river. From Caribou Crossing to a point on the river below Whitehorse Rapids, at the new town site of Whitehorse, a further distance of 44 miles, the conditions are as follows: The first 13 miles cross a rolling sand-hill country with occasional marshes, being remains of old glacier lakes. Wherever the ground is covered with moss & timber the glacial ice is still encountered in the gravel at a depth of 2 ft. under the moss. Fifteen miles from Caribou Crossing two high bridges cross the canyon at the lower end of Lewis Lake. This lake was drained by an earth cut & lowered 75 ft. The road then passes along the east shore of Lewis Lake, crossing former islands & peninsulas, & is of quite remarkable location. At the upper end of Lewis Lake we again get out into the Watson River valley by a series of deep gravel cuts. From Lewis Lake on there are several miles of nearly level grade & light work along the valley. The line then passes along the shores of Ruth & Cougar Lakes & approaches the banks of the Lewes River, in the vicinity of Miles' canyon. The road is here in very heavy cuts & fills, passing through a series of knolls & deep depressions left by the former glaciers. Just behind the Whitehorse rapids the road is placed on a bridge under a steep sand bluff for about a quarter of a mile, & then emerges on a broad level bench at Whitehorse, in the vicinity of the enormous copper mines which lie at a distance of about 2½ or 3 miles, in almost a semicircular form. The maximum gradients on the line between Bennett & Caribou are 1½%, although the line as first established will have a very few sections of 2% grade, to be taken out in the near future. Maximum curvature is 10°." (June, pg. 176.)

At the last session of the Dominion Parliament the name of the British Yukon Mining, Trading & Transportation Co. was changed to the British Yukon Ry. Co., & it was given power to extend its line from Fort Selkirk to Dawson, thence westerly to the 141st meridian, & to construct lines from the main line at Caribou Crossing to Teslin Lake or River, & to Atlin Lake or Atlin City, & to construct & operate branch lines, not exceeding 50 miles in length.

Quebec & Lake Huron.—The Dominion Parliament at its last session incorporated a company under this name with power to build from Quebec to the mouth of French River, Georgian Bay, following as much as possible a straight line between those two points, crossing the River St. Maurice at or near Grandes Piles, passing near St. Michel des Saints on the River Matawin, crossing the River du Lièvre at or near Rapide de l'Orignal, the River Gatineau in the vicinity of Rivière Joseph village & the River Ottawa, near Mattawa, & running south of Lake Nipissing to Georgian Bay. The capital stock is of $5,000,000, & bonds may be issued for $30,000 a mile. The incorporators are: Hon. J. Tessier, Hon. A. Turgeon, Hon. C. A. P. Landry, Hon. C. Langelier, R. Larue, T. Davidson & J. D. Cameron, of Quebec; H. G. Carroll, of Fraserville, J. D. Hawks, J. M. Nicol, S. F. Angus, W. L. Holmes, C. Currie & F. W. Hayes, of Detroit, Mich., & H. F. Shoemaker, of New York. (May, pg. 145.)

Quebec & New Brunswick.—The Dominion Parliament last session incorporated a company under this name with power to build about 130 miles of line from Connor Station, N.B., on the St. Francis branch of the Temiscouata Ry., to the Intercolonial Railway at St. Charles Jct., or to the Quebec Central Ry. at St. Anselme, or to the G.T.R. at Chaudière Jct., Que. The capital stock is $900,000, & the bonds may be issued for $20,000 a mile. The incorporators are: Hon. J. Costigan, Ottawa; A. M. Déchêne, St. Roch des Aulnaies, Que.; T. Malcolm, Edmundston, N.B.; G. Carroll, Rivière du Loup, Hon. F.G. M. Déchêne, Quebec; Hon. A. Turgeon, Levis; J. U. Gregory, Quebec; G.A. Murchie, Calais, Me.; A. Bernier, Edmundston; T. Clair, St. Francis, & A. Bertrand & T. J. Cochran, Edmundston, N.B. (Jan., pg. 16.)

The Dominion Parliament last session voted $192,000 towards building 60 miles of railway, 45 miles from St. Charles Jct. on the I.C.R. towards the St. Francis branch of the Temiscouata Ry., & 15 miles from the mouth of the St. Francis River, N.B., westerly towards St. Charles Jct.

St. Francis River Bridge.—The Dominion Parliament last session revoted $50,000 towards building a railway bridge over the St. Francis River, in lieu of the grant under 62-63 Vic., chap. 7, at St. Francois du Lac, on condition that the bridge be built so as to allow the municipalities to make use thereof, to establish & maintain a suitable railway for the free passage of foot passengers, vehicles & animals, to be approved by the Minister of Railways.

St. Mary's River.—The Dominion Parliament last session incorporated a railway company under this name, with power to build & operate a railway of any gauge from between Lethbridge & Stirling on the Alberta Ry. & Coal Co.'s line to the International Boundary Line, between ranges 24 & 30 west of the 4th meridian. The incorporators are E. T. Galt, C. A. Magrath & P. L. Naismith, Lethbridge; W. M. Ramsay, Montreal; & A. Ferguson, Ottawa. The head office is at Lethbridge, & the capital stock is $500,000. The Co. may issue bonds or other securities for $10,000 a mile.

The Dominion Parliament last session voted $75,000 towards building 30 miles of railway from the A.R. & C. Co.'s Ry. towards Cardston.

Salisbury & Harvey.—At the Dominion Parliament's last session this Co. was empowered to construct & operate branch lines from Turtle Creek station southerly to Baltimore, from Baltimore siding northeasterly to Moncton, & from Baltimore siding southwesterly to Walter's Oil Works, Hillsborough parish. The Co. was also empowered to acquire & operate the Harvey Branch Line Ry. & the Alma & Harvey Ry. (May, pg. 145.)

South Shore Line.—The Dominion Parliament last session incorporated a railway company under this name, the incorporators being B. F. Pearson, Halifax, N.S.; J. J. Tucker, H. H. McLean, M. B. Edwards, & H. F. Puddington, St. John, N.B.; R. Sage, L. P. Morton, E. R. Chapman, & E. C. M. Rand, New York City. The capital is $1,000,000, & the head office is located at St. John, N.B. The Company is empowered to acquire & operate the railway capital stock, etc., of the Shore Line Ry. Co., also to connect with the Washington County Ry., & to acquire & operate it, & to issue bonds or other securities to the extent of $15,000 per mile. The bill as introduced in the House of Commons gave power to connect with other railways in New Brunswick, & to bridge the St. Croix River at St. Stephen, N.B., but these clauses were struck out. (June, pg. 176.)

Victoria Mines.—The proprietors of these are said to have decided not to build the proposed branch from the C.P.R.'s Algoma branch to the mines. (Mar., pg. 79; April, pg. 110.)

RAILWAY APPOINTMENTS, Etc.

Canadian Pacific.—The resignation of Land Commissioner L. A. Hamilton, which was tendered some time ago, has been accepted to take effect at the end of Aug. He will be succeeded by F. T. Griffin, heretofore Assistant Land Commissioner, who will have his headquarters at Winnipeg. It is understood that J. L. Doupe, who has been the chief surveyor of the Land Department for a number of years, will be appointed Assistant Land Commissioner.

R. J. E. Scott, hitherto Chief Inspector of Time Service for lines east of Fort William, with office at Montreal, has been appointed Chief Inspector of Time Service for lines west of Fort William. He will have general supervision of the Co.'s clocks, including the Dey time register clocks, & of the standard watches to be carried by employes, & his instructions in connection therewith must be observed.

D. R. Dingwall, jeweller, of Winnipeg, has been appointed Assistant Chief Inspector of Time Service for western lines. He will discharge such duties as may be necessary from time to time through the absence of the Chief Inspector on eastern lines.

J. H. Thompson has been appointed freight & passenger agent at Baltimore, Md., vice C. G. Osburn.

On the western division S. A. McFetridge, heretofore roadmaster of the Pembina branch & located at Napinka, has been appointed Roadmaster of the Northwestern section with headquarters at Minnedosa, vice R. Watters, deceased. R. M. Binney, heretofore Roadmaster of the Souris, Pipestone & North Central sections, has been given charge of the Pembina section. S. Clarke, who has been section foreman at Chater for 18 years, succeeds Mr. Binney as Roadmaster of the Souris, Pembina & North Central sections.

In addition to the officials of the Manitoba & Northwestern who were mentioned in our last issue as having been given positions on the C.P.R., A. McDonald, heretofore Assistant General Passenger & Freight Agent of the M. & N.W.R., has been appointed Chief Clerk to the Assistant General Freight Agent of the C.P.R. at Winnipeg. A. E. Cox, heretofore Storekeeper of the M. & N.W.R. at Portage la Prairie, becomes Storekeeper of the C.P.R. at Calgary. A. D. McKay, Treasurer, & E. J. Bulgin have not yet completed their services with the M. & N.W.R.

Esquimalt & Nanaimo.—Jos. Hunter, M.-L.A., formerly General Superintendent & Chief Engineer, has been re-appointed to that position. H. K. Prior, who was General Freight & Passenger Agent & who succeeded Mr. Hunter as General Superintendent, has been appointed Purchasing Agent.

Grand Trunk.—It is not the intention to appoint a successor to P. H. Loftus, Foreman of Construction on the Chicago & G.T., who recently resigned to enter service on the Fritchton line. The work is being attended to by R. P. Dalton in addition to his duties as trainmaster.

E. J. Lye, who has been bridge foreman on the G.T.R. at Stratford for a number of years, has been appointed Inspector of the Bridges & Building Department, with headquarters at London, vice R. Kirkpatrick, resigned. His duties extend from Niagara Falls to Sarnia tunnel, & between Toronto & Hamilton, Port Dover & Hamilton, Port Dover & Tavistock, Harrisburg & Tilsonburg, & London & Wingham.

Great Northern (U.S.A.)—H. E. Tudor has been appointed District Freight & Passenger Agent at Montreal, vice W. G. McLean, resigned.

J. A. Sargent has been appointed Assistant General Freight Agent at St. Paul, vice W. H. Hill, appointed superintendent of the Dakota division.

Kootenay Ry. & Navigation Co.—F. S. Forest has been appointed Superintendent of this Co.'s line between Bonner's Ferry, Idaho, & Kuskonook, B.C., with headquarters at Spokane, Wash. He has full charge of operation & maintenance. Mr. Forest is also Superintendent of the Spokane & Northern, a subsidiary line of the Great Northern (U.S.A.)

Michigan Central.—C. R. Emery has been appointed Superintendent of Dining Cars & Dining Halls, with headquarters at Detroit, vice W. H. Lindley, deceased.

Minneapolis, St. Paul & Sault Ste. Marie Ry.—J. H. Thompson has been appointed Freight & Passenger Agent at Baltimore, Md., vice C. G. Osburn. H. N. Paist has been appointed Paymaster at Minneapolis, Minn, vice W. C. Stone, resigned to accept service elsewhere.

Minnesota Transfer.—E. Pennington, General Manager of the Minneapolis, St. Paul & Sault Ste. Marie, has been elected President of the M. T.

Rutland.—J. M. Ferris has been appointed Travelling Canadian Freight Agent, with headquarters at Sorel, Que. He was with the Central Vermont for 26 years, being 20 years agent at Des Riviers, & then Travelling Freight Agent.

Sydney & Louisburg.—The following is a revised list of officials up to date: Superintendent, A. N. McLennan; Master Mechanic, J. Muggah; Engineer, — O'Dell; Trainmaster, Ross Thompson; Roadmaster, W. D. Graham. Their headquarters are all at Glace Bay, N.S.

THE CANADIAN PACIFIC RAILWAY CO.

DIVIDENDS for the half-year ended thirtieth June, 1900, have been declared as follows:

On the Preference Stock two per cent.

On the Common Stock two and one half per cent.

Warrants for the Common Stock dividend will be mailed on or about first October to Shareholders of record at the closing of the books in New York and London respectively.

The Preference Stock dividend will be paid on Monday, October first, to Shareholders of record at the closing of the books at the Company's London Office, 1 Queen Victoria Street, London, E.C.

The Common Stock transfer books will close in London at 3 p.m. on Friday, 24th August, and in Montreal and New York on Friday, 7th September. The Preference Stock books will close at 3 p.m. on Friday, 31st August.

All books will be re-opened on Tuesday, 2nd October.

By Order of the Board,

CHARLES DRINKWATER,
Secretary.

Montreal, 13th August, 1900.

NEW BOOKLETS.

The Chicago, Milwaukee & St. Paul Railway is issuing a series of booklets regarding points of interest along its lines, and if you are interested in the western country, or contemplating a trip, write GEO. H. HEAFORD, General Passenger Agent, Chicago, Ill., for the special publication desired, enclosing four cents in stamps for postage for each one.

No. 1. The Pioneer Limited.
No. 2. The Land of Bread and Butter.
No. 3. The Fox Lake Country.
No. 4. Fishing in the Great North Woods.
No. 5. The Lake Superior Country.
No. 6. Cape Nome Gold Diggings.
No. 8. Summer Days in the Lake Country.
No. 9. Summer Homes, 1900.
No. 11. The Game of Skat.
No. 12. Milwaukee—The Convention City.
No. 13. A Farm in the Timber Country.
No. 14. Stock Raising in the Sunshine State.
No. 15. Hunting and Fishing.

Mainly About People.

M. A. Kerr, of the Hamilton Steamboat Co., is visiting Europe.

President Hill, of the Great Northern Ry., U.S.A., has returned from Europe.

C. R. Hosmer, of the C.P.R. directorate, returned to Montreal from Europe early in July.

W. Mackenzie, of Mackenzie, Mann & Co., returned to Canada from England early in Aug.

I. G. Ogden, Comptroller of the C.P.R., has been enjoying a fishing excursion at Rideau Lake.

Major J. A. Carlaw, ex-cashier of the G.T.R., was married at Toronto, July 18, to Mrs. L. M. French.

Lady and the Misses Van Horne are at their summer residence, Ministers' Island, St. Andrews, N.B.

W. Whyte, Manager of the C.P.R. Western lines, has returned to Winnipeg from his trip to China & Japan.

W. Macmillan, Assistant General Freight Agent of the Michigan Central, died suddenly in Portland, Ore., June 20.

Sir Rivers-Wilson, President of the G.T R., has been elected on the Executive Committee of the British Empire League.

C. F. Sise, President of the Bell Telephone Co., is staying at the Algonquin, St. Andrews, N.B., accompanied by Mrs. and Miss Sise.

Lady Strathcona left London July 17 to take the waters at Carlsbad. Lord Strathcona is spending his August holiday at Glencoe, Scotland.

Travelling Passenger Agent McKenna, of the C.P.R., who was seriously injured by the collapse of a bridge at Grand Falls, N.B., is recovering.

P. G. Close, who died in Toronto July 26, aged 62, was formerly a director of the Toronto, Grey and Bruce Ry., & of the Erie & Huron Ry.

A. C. Wurtele, Secretary-Treasurer of the Atlantic & Lake Superior Ry., died in Montreal, July 16, suddenly, of heart disease. He was 63 years old.

James Cooper, the well-known railway supply dealer of Montreal, is spending the summer at his seaside residence at Carleton, N.B., with Mrs. Cooper.

Mrs. D. B. Hanna, wife of the General Superintendent of the Canadian Northern, & her family recently spent some weeks at the Lake of the Woods.

Miss R. R. Seely, daughter of A. Seely, Treasurer of the New Brunswick Ry., was married in St. John, N.B., July 24, to F. M. Wortman of that city.

Miss Christina M. Hendrie, daughter of W. Hendrie, G.T.R. cartage contractor, was married in Hamilton, July 30, to H. Eckford of High River, Alberta.

Lord and Lady Mountstephen proceed from England to Bombay in October to visit Lord & Lady Northcote. They will tour through India & return to England via Canada.

L. A. Hamilton, who has resigned the Land Commissionership of the C.P.R., will in future reside in Toronto. A portrait & short biographical sketch of him appeared in our March issue.

Sir Wm. Van Horne has, according to a press report, secured from R. G. Reid a site for a shooting lodge on the West Coast of Newfoundland, where he will build a residence & spend a part of each summer.

F. E. Kirby, for a number of years Chief Engineer & Designer for the Detroit Dry Dock Co., & lately connected with the American Ship Building Co., resigned July 1. It is said he will locate in New York as a civil engineer.

Geo. A. Keefer has been appointed Resident Engineer of the Dominion Public Works Department in B. C., in place of J. R. Roy, recently appointed Secretary of the Department. Mr. Keefer was in 1884 Inspector of Bridges for the C.P.R.

M. Neilson, C.E., Manager of the St. John, N.B., Railway, who has been for some months superintending electric railway construction work in Jamaica, was recently recalled to Canada by the illness & death of his mother, who lived near Almonte, Ont.

F. T. Griffin, who will on Sept. 1 succeed L. A. Hamilton as Land Commissioner of the C.P.R., was born in 1854. He has been in the service of the Land Department for 17 years & has occupied the position of Assistant Land Commissioner for the past 9 years.

J. M. Ferris, of Des Rivieres, Que., who recently resigned his position with the Central Vermont Ry. after 26 years' service, & removed to Phillipsburg to take up his residence there, was presented prior to his removal with an address & set of silver by his friends in Des Rivieres.

It is not probable that Sir Rivers-Wilson, President of the G.T.R., will visit Canada this year, as he is a Commissioner to the Paris Exposition. General Manager Hays recently stated that the condition of the road is so satisfactory that he believes his recent visit to England has obviated the necessity of the President or any of the directors coming out this year.

T. J. Kennedy, who recently resigned the position of Superintendent of the North Bay Division of the C.P. Ry., to become General Superintendent of the Algoma Central, has had a varied & successful railway experience. He began as an engineer in charge of section 15 of the C.P.R., near the Lake of the Woods. He then took charge of Manning, McDonald & Co.'s contract on the north shore of Lake Superior.

P. Gifkins, recently appointed General Manager of the Dominion Atlantic Ry. at Kentville, N.S., was born at Harpenden, Eng., Dec. 25, 1850. He entered railway service in 1871 with the Windsor & Annapolis, now the Dominion Atlantic. He served as Auditor & Paymaster until 1872 & for the three years following was Stationmaster at Annapolis & Halifax. From 1875 to 1889 he was Auditor of the D.A., & until 1893 Auditor & General Passenger Agent. Then until 1896 he was General Passenger Agent, & from Jan. to Aug., 1897, Traffic Superintendent, & until his recent advancement, General Superintendent.

C. Murphy, recently appointed Superintendent of the Chapleau Division of the C.P.R., was born in Prescott, Ont., Nov. 20, 1865. He entered the service of the old Montreal Telegraph Co. as a messenger in May, 1879. Four years later, in July, he entered the service of the C.P.R. as night operator at Hull. He has remained with the Co. ever since, serving as chief operator at Ottawa from Feb., 1885; as Despatcher from August, 1885; as Chief Train Despatcher from May, 1890; as Acting Superintendent of the Chapleau Division from August, 1899, & as Superintendent of that division since June 11, 1900.

It is gratifying to note that Canadian watering-places are much more patronized by well-known Canadian people than in days gone by, when the better known U.S. seaside resorts were crowded with Canadians. St. Andrew's, N.B., has a most comfortable hotel, as well as many charming residences. Mr. Shaughnessy, President of the C.P.R., who bought Sir John Macdonald's summer house, Les Rochers, at St. Patrick's, on the lower St. Lawrence, has this year rented his house & gone to St. Andrew's, where Sir Wm. Van Horne has his beautiful house, & his farm with its famous herd of cattle imported from Holland.—Toronto Globe.

The understanding which exists between England & Japan has perhaps more to do with Canada than most people are aware of. The C.P.R. route, which has been so greatly patronized by Japanese merchants & the better class of that flowery land, who were wending their way to the English universities, has so promoted personal intercourse that there is already a considerable bond of interest between the two countries. Sir Wm. Van Horne is a most earnest student of the Japanese language, & his collection of Japanese curios is perhaps the finest private collection in the world, & while he has the mania for collecting the purely artistic article, he has mastered the "lore" & sentiment of the artist, which gives him a keen insight into the thought of the nation he so much admires. - Toronto Globe.

R. J. E. Chapple, recently appointed Acting Superintendent of the C.P.R. at Schrieber, Ont., was born in Plymouth, England, March 15, 1862. His first railroad service was in the office of the Division Engineer of the Cromwell line of the Great Western of England in 1876. In July, five years later, he was appointed a clerk in the accountant's office of the G.T.R., & a month later was transferred to the fuel agent's office. He entered the service of the C.P.R. Mar. 26, 1882, & has served since that time as stenographer to the Assistant General Superintendent from 1883; as Chief Clerk to the Vice-President from 1892; as General Superintendent's assistant on the Eastern Division from April, 1894, & Division Superintendent at Schrieber (his present position) from June 18, 1900.

Capt. John Donnelly, sr., died at Kingston, Ont. July 13, after a severe illness. He was one of the cleverest "wreckers" on the lakes. He raised the propeller Brooks, sunk in 84 feet of water, three miles from the Ducks, on Lake Ontario. All the crew of this property were lost at the time of the accident. He raised the propeller Magnet & cargo, from where she was sunk by collision in 109 feet of water, abreast of Howe Island. He has taken nearly all of the boats of the western division of the Richelieu Line out of critical positions, & his work has not been confined to inland vessels alone, as he raised the steamer Vicksburg, of the Dominion Line, sunk below Isle Verte, in the Gulf of St. Lawrence, & the steamship France, of the National Line, sunk in the river below Montreal. He was president of the Donnelly Wrecking & Salvage Co.

L. E. Westbrook, ticket agent in the New York office of the G.T.R., disappeared June 9. Mr. Westbrook, who is 35 years old, entered the service of the Co. as a boy, acting as ticket agent at Niagara Falls & Buffalo before his promotion to the New York office. Manager Dwyer vouches for the statement that his accounts are correct. When Mrs. Westbrook entered the dining-room at the breakfast hour she found a note addressed to her. It said: "I am going away—perhaps for short & perhaps for long—but will be back some day. My love is with you. Be good to the little ones." On Aug. 9 he appeared at the home of his aunt, Mrs. Jennie Dorr, in Port Jervis, N.Y. He was apparently dazed & unable for a time to talk coherently. The previous four weeks, he said, had been a blank to him, & he knew absolutely nothing of what had occurred.

A. J. Gorrie, recently appointed Superintendent of the Port Arthur, Duluth & Western Ry. at Port Arthur, was born at Raith, Kirkcaldy, Scotland, Dec. 10, 1868. After being educated in the public schools, he began railway work in the General Goods Manager's office of the Caledonian Ry. at Glasgow in May, 1883, & served with various departments & at several stations of that company. Coming to Canada in May, 1892, he was employed as clerk in the Superintendent's office

of the C.P.R. at Fort William, Ont., until Aug., 1894, when he was promoted to Chief Clerk & Accountant. He held that position until Oct., 1899, when he entered service with the Canadian Northern, in charge of the operating department at Winnipeg under the General Superintendent. He continued in that position until his recent appointment to the P.A., D. & W. which will form part of the Canadian Northern system.

Thos. Marks, of Port Arthur, who died in Toronto General Hospital July 9 after suffering from a malignant tumor & Bright's disease, was born in Glenashene, Ireland, in 1834. He came to Canada in 1839, & with the family settled in the county of Carleton, near Ottawa. He spent some years sailing on the lakes, and in 1850 settled on St. Joseph's Island as a farmer. In 1857 he started a general store at Bruce Mines, on the north shore. The business grew, & was extended to Port Arthur in 1869 & Sault Ste. Marie in 1871. This was continued in various parts of Algoma until 1897. He entered Port Arthur when nothing but the Government buildings existed, & besides erecting his own structures built the prominent business & private establishments in that town. His first railway enterprise was a line of seven miles from Prince Arthur's Landing (now Port Arthur) to West Fort William, which was afterwards acquired for the C.P.R. He next promoted & saw built the Port Arthur, Duluth & Western Ry., running to the Minnesota boundary from Thunder Bay, which is now part of the Canadian Northern System. In 1877 he successfully tendered for the construction of section A of the C.P.R., at a cost of about $2,500,000. During the construction period he did an enormous supply business on the north shore, besides maintaining a fleet of three steamers. Subsequently he brought to Canada the big steamer Algonquin. He was a type of the shrewd, pushing pioneer, whose efforts did much for the good of the country. Before the C.P.R. was built he was known to often cross on foot the ice of Georgian Bay in the winter from Bruce Mines to Penetanguishene & on the ice of Lake Superior from Port Arthur to Duluth in connection with his business duties. He is survived by his widow, who was Miss Buchanan, & by one daughter.

The Intercolonial Ry. has placed an order with the Richmond Locomotive & Machine Works for 10 consolidation locomotives with 56" drivers ; weight in working order 164,000 lbs., with 147,000 lbs. on drivers. The boilers are to be of the straight top type 66" diameter at the smoke box end, & will carry 200 lbs. steam pressure. Five of these engines will be compounds with 22½" & 35" x 30" cylinders.

A train of freight cars ran off the Wellington St. siding of the G.T.R. at Montreal, July 31, & crashed into a house. The house was wrecked, & the inmates had a very narrow escape. Several of the cars were smashed & the contents strewn over the streets.

The New Era on the G.T.R.

One of the marks of the industrial progress of Canada in recent years has been a very general improvement in the roadbed, bridges, stations, rolling stock & general equipment of the G.T.R. It may be well before entering upon any of the details of this work to mention one result. The International Limited train, which formerly occupied 12 hours in the run from Montreal to Toronto, 333 miles, now travels from Montreal to Detroit, 557 miles, in the same time. Between Montreal & Toronto a large amount of double-tracking has been done. At Trenton there have been heavy grade reductions, the roadway embankment has been raised about 21 ft. at the highest point, & a double-track bridge is being constructed across the Trent River. Between Vaudreuil & Ste. Anne's, also some heavy grades have been eliminated by the raising of the roadway embankment. Contractors are now at work double-tracking the section between Hamilton & Niagara Falls. The reorganization of the Chicago & G.T.R. embraces the double-tracking of the 335 miles from Port Huron to Chicago, including heavy grade reductions, & much of the work has already been done. Double-tracking & reduction of heavy grades of course conduce to speed as well as to safety, & a similar remark may be made in regard to the ballasting of many miles of track, & the substitution of 80 lbs. rails for lighter material. Large expenditures have

been made for new rolling stock, powerful modern locomotives have been built, freight cars of 30 tons capacity have replaced the old 12 & 15 ton cars, & the passenger service has been improved by new coaches, parlor cars, 2 new dining cars of the latest design, & 4 cafe parlor cars, introduced for the first time into Canada.

The Niagara steel arch bridge was completed & formerly opened for traffic in Sept., 1897. The arch, which is the longest in existence, is 550 ft. in length, & the bridge, including approaches, has a total length of 1,100 ft. It replaced the old original suspension bridge, which was built in 1855. The new bridge is double-tracked & designed to carry on each track a load of 2 locomotives with 4 pairs of drivers each, & carrying 40,000 lbs. on each pair, followed by trains weighing 3,500 lbs. per running foot, also a load of 3,000 lbs. per foot on the lower roadway, over six times the capacity of the old suspension bridge.

The Victoria Jubilee bridge, replacing the old tubular bridge which was completed & opened for traffic by the Prince of Wales in 1860, is composed of 24 spans, averaging 245 ft. each, making a total length of about 1½ miles. It is a double-track structure with driveways & footwalks on each side. This bridge was constructed in 8 months' actual working time, as there were some delays due to severe weather. Railway traffic over the bridge was conducted as usual & without interruption during its reconstruction, & the total delay to trains during the entire period of 8 months was equal to but 22 hours, the longest single delay being about 2 hours. The old bridge weighed 9,044 tons, while the new structure weighs over 22,000. The width of the old bridge was 16 ft. The new one is 66 ft. 8 in. wide. The height of the old bridge was 18 ft.; the new, over all, is from 40 to 60 ft. high. It is designed to carry a total load of 11,000 lbs. per lineal foot, while the old bridge would carry but 2,500. The cost of reconstruction of the new bridge was about $2,000,000. The new bridge with its additional capacity of double track & roadways on each side was conceived by Mr. Hays & was considered by him necessary to properly develop the possibilities of the railway & meet the demands of increasing traffic.

The international bridge connecting Fort Erie, Ont., with Buffalo, N.Y., is really two structures: one across the Niagara River proper, 1,967 ft. long; the other across Black Rock Harbor, 517 ft. long, with a draw bridge 214 ft. long. This bridge is being reconstructed, & it is expected will be completed with the close of the year. It will cost in the neighborhood of $300,000. The new bridge is designed to carry the heaviest weight required by the use of modern rolling stock & loads, being considerably more than double the capacity of the old bridge. Many improvements have been made in smaller bridges all over the system, aggregating a total expenditure of upwards of $750,000, comprising the entire renewal of every bridge on the line from Montreal to Portland, including the bridges across the Ottawa River at Ste. Anne's & Vaudreuil, across the Riviere Rouge west of Port Union, & on lines west of Toronto, across the Grand River at Paris, across the Thames at London, & across Sixteen Mile Creek east of Hamilton—all of these latter being double track structures.

In order to accomplish the present passenger and freight service it has been found necessary to rearrange & improve the yards & buildings at many important points, such as York, Sarnia, Port Huron, Niagara Falls, Fort Erie & others. At Sarnia & Port Huron there have been constructed entirely new engine houses of 30 stalls capacity, comprising modern coal chutes, sand houses, &c. Much has been done in the way of rearranging switching yards, coaling & water facilities at Toronto, Belleville, Montreal, London, Hamilton, Island Pond, Portland & all the larger terminals.

A marked improvement has been made in replacing old wooden station buildings with handsome new brick & stone or frame structures, arranged to meet the increasing requirements of growing towns. Among these may be mentioned the new buildings at Berlin, Guelph, Galt, Merritton, Vaudreuil, Ste. Anne's, Lachine, St. Henri, St. Lambert, St. Hyacinthe, Arthabaska, etc. A new general office building is under construction in the heart of Montreal, on a valuable piece of land donated by the city for that purpose. It will be a handsome building, 5 stories high, of Quebec gray granite up to the first floor, & then of Indiana gray lime stone. It will occupy an entire city block, 200 x 135 ft., will provide double the present office space, & will be one of the finest buildings in America devoted to the exclusive office purposes of one railway company. The expenditure will be $500,000. There have also been erected at the Co.'s works, Point St. Charles, Montreal, handsome offices for the use of the motive power department. Arrangements have been made with syndicates under which elevators have been constructed at Midland & Goderich, & one is now under construction at Meaford, for the handling of large quantities of grain, & at the latter point is involved the deviation of the railway from its present location to a position on the harbor in the town.

In connection with the administration of the railway one of the most important changes that has been made under Mr. Hays' management has been the introduction of the standard rules approved & adopted by the American Railway Association for the running of trains. These rules, relating to signals, etc., are in use upon the greater part of the 190,000 miles of railways in the U.S., & the importance of uniformity will be at once apparent. In order to provide for the safety of its employes the Co. has spent $1,100,000 in equipping cars & engines with automatic air brakes & couplers. An idea of the magnitude of the concern will be gathered from the statement that the Co. employs about 24,000 people, & pays out annually in salaries & wages from $10,500,000 to $11,000,000. Although Mr. Hays is a strict disciplinarian, insisting upon close attention to business & total abstinence while on duty, yet his uniform courtesy wins him the respect & hearty co-operation of officers & employes.

The result of the policy which we have outlined has been a vast improvement in the securities of the Co. & its credit. The stock securities have an enhanced value of $80,000,000 as compared with the market prices of 1895 & the early part of 1896. This improvement is due to the increased payment of dividends to the English holders, amounting to $3,762,434 for the four years from Jan. 1, 1896, to Dec. 31, 1899. A deficiency in interest on perpetual debenture stock which existed on Dec. 31, 1895, has been earned & paid by the Co. since that date. The total amount thus represented is $4,856,009. This is only $2,814,025 less than the net dividends earned in the 10 years preceding the time when Mr. Hays took charge of the road.

Among the financial successes of the present management has been the incorporation in the G.T. system of the Central Vermont Ry. This road is the chief artery of commerce of the State of Vermont, with an important line extending through Massachusetts & Connecticut to Long Island Sound, having a total length of 570 miles, & affording an outlet for the system direct to New York & Boston. Under the recent reorganization of the C.V. Co. the G.T.R. was awarded more than two-thirds of the stock, as well as a large proportion of the $12,000,000 of bonds issued, in settlement of its claims against that property. The leasing of a portion of the G.T.R. system to the C.P.R. between Toronto & Hamilton, to the Wabash R.R. between St. Clair & Niagara Rivers, & to the I.C.R. east of Montreal were good strokes of policy & in the best interests of Canada, affording the same competition as would have been brought about by unnecessary duplication of lines.

There was a time, as most of our readers will remember, when the service of the G.T.R. was uniformly bad, when the delays in the running of trains were subjects for angry derision, & when the curses of shareholders were heard by every Canadian who visited England. For the change which has taken place the present General Manager is entitled to a very large share of credit, & there is good reason for congratulating not only those who are financially interested in the road, but the travelling & shipping public & the country at large, for the national credit abroad has certainly been improved by the betterment in the position of so large & important a concern.—Toronto Globe.

Among the Express Companies.

In accordance with an agreement arrived at by all the companies interested the entire city of Chicago, within its corporate limits, is to be considered as a common point, open to all companies under the existing rules pertaining to common points.

The Dominion Express Co. has warned its agents of two recent successful attempts at defrauding merchants in towns adjoining Toronto. The scheme is to buy goods & have them shipped to a certain point C.O.D., & then go to that point & steal them.

Some time ago a box containing $500 worth of gold dust was stolen from the Dominion Ex. Co.'s office at Spence's Bridge, B.C. Inspector McKenzie, of the C.P.R. detective department, was given charge of the case, & he arrested three Indians on suspicion, they having some gold in their possession. They denied all knowledge of the crime. During the trial before the Police Magistrate which followed, station agent Webber at Spence's Bridge confessed that he had taken the dust, & could place the Co. in possession of it. He was committed for trial at the fall assizes at Kamloops.

The Dominion Ex. Co. put a new tariff in force July 25th, under which the rates between Toronto & Montreal & points as far west as Moosejaw have been reduced 25 & 50c. per cwt. The rate only applies as far east, however, as Sudbury. Formerly the charge from Montreal was 25c. higher than Toronto, but it has now been made the same. A special rate has also been put in force to Crow's Nest points west of McLeod, to Kootenay Landing, B.C., the reduction ranging from 75c. to $1.75 per cwt., according to distance. The rate to Creston from Toronto, formerly $12.25, is now $11.25; from Toronto to Fernie, formerly $12.25, is now $10.50. The reduction to Crow's Nest points will doubtless mean an increase in business.

The Dominion Ex. Co.'s last general circular contains the following:—"The Supreme Judicial Court of Massachusetts rendered a decision upholding the Fifty Dollar Clause, which has sufficient bearing on the receipts issued by this Co. to be of interest to all employes of the Co., the particulars of which are therefore given herewith: A box was delivered to a driver for the Adams Ex. Co. in Boston. A card tacked to the box gave the address in New York to which the shipper wished it sent. There were no marks to indicate the value or contents of the shipment. The driver gave a receipt to the shipper's clerk in which no value was stated, but which was stamped, 'Value asked & not given.' The shipment was sent 'Collect.' The box was never de-

livered to the consignee. The shipper brought suit to recover the value of the shipment, which contained paintings worth $3,000. It was proved that the shipper knew that extra charges were made on shipments valued at more than $50, & that he was familiar with the clause in the receipt limiting the liability of the Co. in case no value was declared. The Court decided that the shipper could not recover more than $50. The decision shows, among other things, the great importance of making the shippers acquainted with the terms of the receipt. These remarks will apply with equal force to the notation of Owner's Risk. In many cases this consideration may be controlling. Receiving clerks, drivers, & all others issuing this Co.'s receipts are requested to see that shippers are fully cognizant of any notations on the receipt limiting the Co.'s liability where value is not declared, or where shipments are accepted at owner's risk."

General Telegraph Matters.

A wireless telegraph service has been opened between the German island of Borkum & the Borkum Reef lightship, in the North Sea. Ships are reported by this means between 6 a.m. & 8. p.m.

The Commercial Cable Co.'s new cable to the Azores Islands is laid & in operation. It connects at the Island of Fayal with the Europe & Azores Co.'s cables from the Azores to Portugal, & completes the Commercial's fourth route across the Atlantic. It is the first cable to connect the Azores direct with America. It also opens direct communication for the first time between the U.S. & Portugal. The Europe & Azores Co.'s cable makes connection at Lisbon with the Portuguese land lines, the Eastern Telegraph Co.'s cables to Spain, the Mediterranean ports, all Africa, India, China, Japan, Australasia & the Philippines, & with the Western Telegraph Co.'s cables to Brazil, Argentina & other ports of South America.

A new plan has been suggested by D. Tommasi for restricting the interception of wireless telegraphy messages. The idea is to use two transmitters of different ranges of action. The transmitter with the larger range is used for sending the message to the station for which it is intended, while the transmitter with the shorter range is employed in confusing the message within that range by an unmeaning series of dots & dashes. The range of a transmitter can fortunately be adjusted by altering the size of the spark gap, & it should not be difficult to restrict the chances of interception to a zone of, say, half a mile. If, in addition, the spherical wave train could, by reflection or otherwise, be converted into a beam of the form of a searchlight, the problem would be solved in a way.

A new system of multiplex telegraphy has been devised by M. E. Mercadier, who has recently described the apparatus before the Société de Physique, of Paris. The transmitter is an electro-diapasm ; the receiver is a telephone, & the relay is a differential telephone, which serves at the same time to receive all the signals sent by wave currents of different wave-lengths, & to distribute them to the receiver circuits, containing twelve telephones constructed according to his system. The effect of the signals transmitted upon the receivers at the same end is neutralized by a combination of condensers & an artificial line. M. Mercadier gives an account of the practical results obtained by this system, which include the transmission of twenty-four messages at once over the same circuit from Paris to Bordeaux.

Two engineers, of Berlin, have recently invented an apparatus which transmits to a distance the relief of a figure, either living or inanimate ; the apparatus has received the name of "teleplastic." The relief may be received in full size, or may be enlarged or diminished at will, being quite exact. The transmitter consists of a frame containing a great number of metal rods placed side by side, & movable back & forth. The receiver is a similar apparatus, in which the rods are moved by a series of electromagnets ; when a relief is pressed against the rods of the transmitter a series of contacts is established, which causes the receiver to reproduce the relief by means of its rods, whose movement corresponds exactly to that of the transmitter. It is expected that this apparatus will render service especially in the pursuit of criminals, as it will give an exact reproduction of his features.

Tenders for the manufacture and laying in the Pacific Ocean of 8,272 nautical miles of telegraph cable between Vancouver & Fanning Island, Fanning Island & Fiji, Fiji & Norfolk Island, Norfolk Island & New Zealand, Norfolk Island & Queensland, are in-

vited by the Pacific Cable Committee on behalf of Her Majesty's Government & the Governments of Canada, New South Wales, Victoria, New Zealand & Queensland. It is proposed to divide the whole undertaking under three distinct contracts, for any one or more of which contractors may tender. Each of these contracts will include a clause under which the contractor guarantees the good electrical condition & working order of the cables for 30 consecutive days after the completion of the laying. A fourth contract is also proposed for surveying & sounding the whole route before the cables are laid. The last day for the reception of tenders in London, Eng., is Aug. 14.

In the introduction to the official catalogue of the Canadian Section of the Paris Exposition, Geo. Johnson, F.S.S., says :—" When British North America sent her wares to the London Exhibition of 1851, the country had just begun to supply herself with telegraph lines. Montreal & Quebec had been connected by wire for three years ; a single uninsulated wire connecting Toronto, Hamilton, Niagara & St. Catharines was all that Upper Canada had to show. Nova Scotia & New Brunswick had inaugurated the electric telegraph a couple of years before. There may have been 300 or 400 miles of wire strung throughout the country at that date. Now there are 76,000 miles. In 1851 there may have been a score of offices for the transmission of telegrams. There are now over 2,600, or one for every 2,000 of the people, Canada, in this respect, standing ahead of most European & of all American countries."

In the House of Commons, July 2, upon concurrence in the vote for telegraphs, Sir Adolphe Caron complained that although the Canadian, British Columbia & Dawson City Telegraph Co., of which he & ex-Premier Turner of British Columbia were directors, had been chartered by Parliament for the purpose of building a telegraph line to Dawson, the Government had built a line itself. He urged that such action on the part of the Government had done much injury to Canadian enterprise in London. He urged the claim of the Co. for consideration, in view of the expense it had been put to in anticipation of building the line. Mr. Mulock, not being aware of the facts to which Sir Adolphe alluded, could not discuss the claim of the Co. for indemnity. He quite endorsed the position taken by Sir Adolphe as to the duty of the Government to keep faith not only with those who take charters but with the public who invest in enterprises. Judging from the statements of Sir Adolphe, however, the claims rested upon statements which had been made by the ministers of Public Works & Railways & Canals individually. When the Minister of Public Works returned he would bring the matter to his attention.

Dominion Government Telegraph Lines.

J. B. Charleson, who is in charge of construction of the line from Quesnelle to Atlin, B.C., to connect with the line to Dawson, Yukon, on arriving at Vancouver, July 16, said he had been informed by the Public Works Department that $12,000 had been appropriated for the construction of a telegraph line connecting the present system from Dawson to Fort Cudahy, on the international boundary, & that Brigadier-General Greely, of the U.S. War Office, had informed the Government that a cable was to be laid from Nome to St. Michael, & a land line from St. Michael to connect with the Canadian branch line to Fort Cudahy. The U. S. Government will build the line in connection with the signal service of the U.S. War Department, & it will be constructed under the direction of F. Green. Before leaving Chicago for Alaska early in August, General Greeley said : "Some time ago I perfected arrangements with the Dominion Government & already the Canadian engineers are building their line from Dawson northwesterly to meet ours at the boundary. The two Governments have joined hands to carry the wires through the heart of the northern wilderness."

An Ottawa despatch of Aug. 3 says : " J. B. Charleson reports that the section from Atlin to Telegraph Creek, 222 miles, is completed. The section from Tagish to Atlin, 80 miles, was previously built, which makes 302 miles of wire at the northern end. To the south, wires have been strung from Quesnelle to Hazelton, 342 miles, leaving 300 miles between the two inside ends of the wire. A connection will be made about the end of Sept., or early in Oct. About the same time connection will be made with the line into Dawson. The line from Quesnelle to Ashcroft, 220 miles, is being re-poled. Branches are to be built to Horse Fly, 72 miles, & from French Lake to Manson Creek, in the Omenica district.

Dominion Telegraph Company.

At the annual meeting in Toronto, July 11, the following financial report was presented :—

ASSETS.

Capital expenditure	$1,281,819 47
Toronto, Grey & Bruce Ry. Co. 1983 bonds, & interest thereon	1,596 24
Cash in bank & on hand	30,194 16
	$1,313,609 87

LIABILITIES.

Capital stock paid up	$1,000,000 00
Dividends unclaimed	1,787 20
Dividend payable July 16, 1900	14,000 00
Suspense	372 13
	$1,016,159 33
Balance of credit of profit & loss account	297,450 54
	$1,313,609 87

The directors reported the payment to the Co., by the lessees—the Western Union Telegraph Co.—of the guaranteed interest of 6% per annum on the capital stock of the Co., up to & including June 30, 1900, the proceeds of which have been promptly distributed quarterly to the shareholders.

Following is the organization for the current year :—President, T. Swinyard ; Vice-President, Sir Frank Smith ; other directors, General T. T. Eckert, C. A. Tinker, A. G. Ramsay, H. Pellatt, H. Mackenzie, T. F. Clark, T. R. Wood ; Secretary-Treasurer, F. Roper.

General Telephone Matters.

Poles for the New Brunswick Tel. Co.'s line from Fredericton to Chatham are erected as far as Green Hill.

The Bell Co. has recently issued official directories of subscribers for Montreal city & suburbs, Southern Quebec & Northern Quebec.

The Kinnear's Mills Telephone Co. states that the proposed line from Kinnear's Mills to Thedford Mines will probably not be built this year.

The Bell Co. is making extensive improvements to its Winnipeg premises & system, including the laying of underground cables on Portage Avenue.

The Gloucester Tel. Co., Ltd., is being incorporated ; capital, $2,000 ; chief place of business, Bathurst, N.B. R. Ross, J. H. Stewart & C. Ross, Bathurst, are directors.

The Edmonton, Alberta, District Tel. Co. reports 37 miles of wire and 99 instruments in use. This includes the lines to St. Albert, Morinville & Strathcona. The poles & wire for the Morinville line were furnished by the Dominion Government.

The Bell Co. has completed a copper metallic line from Three Rivers to Shawinigan Falls & Grand Mere, Que., providing those places with perfect communication to Montreal, Toronto, Quebec, Ottawa, Boston, New York & intermediate points.

The New Brunswick Telephone Co. has linemen going over the line between St. John & Fredericton, repairing the poles & cross bars & putting everything in shape for stretching the new copper wire which the Co. is to install over all its trunk system.

The Neepawa, Man., telephone system, which is operated by the town, has 117 subscribers & a number of applications for connection. The rates are $20 for business & $10 for house service. The system is metallic, & the wire mileage is about 10 miles.

In the introduction to the official catalogue of the Canadian Section of the Paris Exposition, Geo. Johnson, F.S.S., says : " In 1851 there were, of course, no telephones in Canada. There are now 90,000 miles of wire under the administration of 62 companies, so that city & country are well supplied with these time-savers."

The New Brunswick Tel. Co. is perfecting its long distance service throughout the province, & is constructing lines between St. John & St. Stephen, & between Fredericton & Chatham. A copper line has been stretched between St. John & Moncton. The St. John exchange is to be reconstructed & brought up to date.

The Bell Co. is building about 200 miles of long distance lines in Manitoba this year. The principal line is from Winnipeg to Brandon, with intermediate offices at Portage la Prairie, MacGregor, & Carberry. The line has been completed between Winnipeg & Portage la Prairie. A branch line will run from Carberry via Neepawa to Minnedosa, with intermediate offices at Neepawa & Franklin.

In reference to the statement published in our last issue to the effect that a telephone line, in which the Bonny River Lumber Co. is said to be interested, is being built between St. Martins & St. John, N.B., we are informed that no new line is being built between the points mentioned. The New Brunswick Telephone Co. is building between St. John & St. Stephen, N.B., also from Fredericton to Chatham, N.B.

The Berlin, Ont., Town Council has unanimously carried this resolution : " That the valuable exclusive franchise granted to the Bell Tel. Co. to operate its system in this municipality be not renewed at its expiration, but that the matter be referred to the fire & water committee with a view of investigating & ascertaining the probable cost & revenue of establishing a permanent local town system & operating therewith the town fire alarm system."

The telephonograph is a new invention which comes from Denmark. It is a combination of the telephone with a newly constructed phonograph, which makes it possible to fix & preserve conversations in the absence of the intended hearer, so that he can listen to the message after his return. But the importance of the invention reaches much further. Through the use of magneto-phonography it is possible to multiply the effect of the sound & to give the sound greater force.

The telephone has superseded the telegraph to a certain extent on the Santa Fe Ry. The Co. has now in operation on the Chicago, eastern & middle divisions, a private telephone system connecting the majority of the block signal stations, & the passage of trains in & out of the various blocks is now scheduled from operator to operator by telephone instead of telegraph as heretofore. However, the management of the road believes in the telephone as a means of communication in railroad work only to a limited extent.

E. A. Chenery, Superintendent of Telegraph, Terminal R.R. Association of St. Louis, says—"The time is not yet ripe, & I question whether it ever will be, for railways to dispense entirely with the telegraph in the handling of their vast business. That a great amount of matter now sent by telegraph might as well go by mail is as true as that a larger amount of such business, in order to obtain quick results, could better be handled by telephone. Great benefits are obtained at large terminals where adequate telephone facilities are provided. Delays in placing of car orders, engine assignments, material orders, working directions & numberless other important matters, which formally resulted when the telegraph was used, seldom occur now since the advent of the up-to-date telephone system. The fault for the delays referred to is not necessarily always with the telephone department, as seems to be the general impression. Messages often are dictated to a stenographer along with a bunch of letters, & in due course of time reach the hands of a messenger whose ultimate destination is the telegraph office, the messages finally landing on the operator's table where they meet with delay again, the operator having a moment before 'cleared' the office for which the same is destined, & the wire is now busy. All this time the sender of the message is waiting for a reply & blames the telegraph for the long wait. How much more satisfaction is there in the telephone method, when with one on your desk you call up your man, issue directions or get information desired in about the same time it takes to dictate a message after the manner first mentioned. Several progressive railways are recognizing the value of the telephone & are equipping their terminals with modern exchanges, they in turn connected with long-distance service, & each terminal brought in close touch with the general office. When the value of such facilities become better known, the handling of the general business of a railway will be greatly improved."

Time Service on C.P.R. Western Lines.

Manager Whyte has issued a circular reorganizing the time service on the C.P.R. lines west of Fort William. The following rules went into effect July 15 :

Train masters, road foremen of locomotives, roadmasters, bridge & building masters, conductors, engineers, train baggagemen, brakemen, firemen, yard masters & yard foremen must each carry a "standard" watch when on duty. The minimum standard of excellence adopted by this Co. is a grade known among American movements as 17 jewelled, Breguet hair spring, patent regulator, adjusted to temperature, isochronism, & at least three positions, & corresponding to Waltham, Appleton, Tracy & Co. Nickel, Elgin B. W. Raymond Nickel, Hampden New Railway, Illinois Bunn, Hamilton 936, Ball Official Standard, & all grades equal or above, the variation of which must not exceed 30 seconds a week.

Employes required to carry standard watches must submit them for half-yearly inspection in Jan. & July of each year, to the various watch inspectors, of whom 15 have been appointed on the Western & Pacific Divisions. Every employe designated above must apply to his superior officer during Jan. & July of each year, for an order for examination which he must take or send together with his watch to the inspector, who will, if the watch is satisfactory, issue a certificate & forward it to such superior officer. If the watch is below the standard it is to be rejected, & such superior officer promptly advised. Any watch so rejected must not be used in service nor passed upon by another inspector. Employes working where no inspector is accessible will be notified where to send their watches, together with the orders for examination.

In addition to the half-yearly inspection, the employes designated above must submit their watches to the inspectors for comparison with standard time within each of the first & third weeks of each month hereafter, so that a record of the rating of their watches may be made. This comparison & rating of watches with standard time is of great importance, & if it is not possible for employes to submit their watches for the purpose during the weeks stated above, they must do so on the first opportunity thereafter. It is desirable that watches should be submitted for this purpose oftener than twice every month if employes are able to do so, & indeed as frequently as possible. No charge will be made for the semi-monthly or more frequent comparison or for the half-yearly inspection of watches by the designated inspectors. Cards for keeping the record of the rating of their watches will be furnished to employes by the inspectors, & a similar record must be kept by the inspectors, who shall forward them to the Chief Inspector of Time Service at the end of each quarter.

Employes must not themselves set or regulate their watches unless a watch stops owing to neglect to wind it. The non-observance of this rule will render the rating records of their watches valueless & defeat the object desired

to be attained, namely, that of securing to every employe a watch regulated well within the limit of variation allowed by the Co.

Watches must be cleaned at least once in 15 months, but it is not advisable to postpone this to the limit, as inspectors cannot possibly provide standard loaning watches for all at one time. When watches need cleaning or repairing they may be left with the inspector, or if the owner desires, may be taken to such watchmaker as the owner may select, but the watch carried in the meantime, before being used in service, must be submitted to the inspector for examination, who will, if satisfactory, issue a certificate & mark across it "loaned watch," & forward each certificate at once to the Chief Inspector of Time Service. When a watch is repaired or cleaned by other than an inspector, it must afterwards & before being used in service be submitted to the inspector for examination & approval. An employe having his watch cleaned by other than an inspector must get from him a statement in writing as to the cleaning of the watch & the date thereof, because when the watch is presented for half-yearly inspection the inspector cannot issue certificate without proof of the cleaning. When a watch is left with the inspectors of the Co. to be cleaned or repaired, a standard watch will be loaned to the employe free of charge, until his own is returned to him, but the loaning watch must not be kept out longer than 15 days without the permission of the inspector.

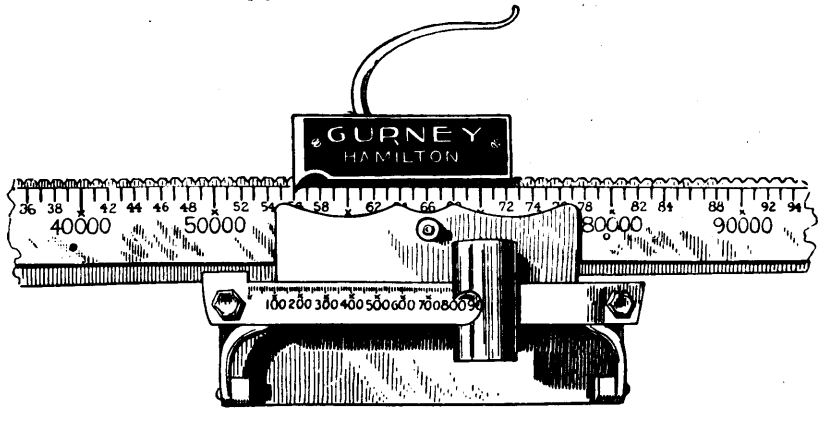
Inspectors will supply a watch movement of the minimum standard of excellence for use on this railway, put up in a case of such metal as the employe may wish, with the price, if desired, payable in monthly payments as may be agreed upon—not, however, exceeding 4 in number—the amount of such payments to the inspectors to be deducted from the pay roll, if desired. It is not obligatory on employes to purchase standard watches from the inspectors, but all watch movements must be up to the Co.'s standard.

Superintendents will send lists of employes who are required to carry standard watches to the inspectors before the commencement of each half-yearly inspection (that is the last week of June & Dec. of each year) & inspectors will thereon check off the watches as presented for inspection, returning all lists to the Superintendent at the end of the inspection months (Jan. & July). Superintendents will see that all certificates of the half-yearly inspection of watches are filed with them by the end of the months of Jan. & July in each year.

All employes of the Operating Department who, under these instructions, are not required to carry a standard watch must, if opportunity offers, compare their watches daily with standard time. Roadmasters & bridge & building masters must compare their watches with the watches of their foremen whenever opportunity offers.

The purpose & aim of this system of watch inspection being to ensure efficiency & safety in train service, & afford greater security to life & property, the hearty co-operation of employes in making the operation of the system successful is earnestly enjoined. It is hoped that officers & employes, other than those who by these instructions are required to carry standard watches, will, as opportunity offers, furnish themselves with such watches.

Agents & others in charge of the Co.'s clocks have been notified that clocks will not be allowed to remain in service until, owing to their defective condition, they no longer keep reliable time, but will be ordered to Winnipeg by the Chief Inspector of Time Service for cleaning & repair about every two years. When a clock requires to be sent in for cleaning or repair, a relief clock will first be supplied by the Assistant Inspector of Time Service. The clock requiring repairs must then be shipped to him. In the event of a clock getting out of order before it is ordered in for cleaning or repair, the agent or employe in charge of it must report the fact by wire to the Assistant Inspector at Winnipeg, so that a relief clock may be supplied & the defective clock shipped to him at once. Cards will be supplied to agents & those in charge of clocks with which enginemen & trainmen will compare their watches (which will hereafter be known as comparison clocks) for recording the daily rating & the winding, setting & regulating of such clocks. These cards must, after the record of each month is complete, be forwarded to the Chief Inspector of Time Service, Montreal. Agents & others in charge of the Co.'s clocks must, hereafter, every day without fail, compare them with standard time, & if they vary more than 30 seconds, correct them, setting them at 8.55, 9.55, or 10.55, whichever hour it may be that standard time is sent over the Co.'s wires on the division, & checking them with standard time at 8.56, 9.56, or 10.56 accordingly.



REED RECORDING ATTACHMENT FOR RAILWAY TRACK SCALES.

Recording Attachment for Track Scales.

The Gurney Scale Co., Hamilton, Ont., has issued a circular about the Reed Recording Attachment for railway track scales. The circular says the attachment is designed to give a mechanical record of weight shown on the beam, thereby avoiding all disputes which so frequently arise in taking the weight from the beam in the ordinary manner. In the use of the Reed Recording attachment a mechanical record of the weight is obtained & it is not necessary for the weighmaster to read the beam. Railway managers & users of railway track scales generally will appreciate the advantage of securing an absolute correct record of weights. It is claimed that the Reed Recording Attachment embraces the following advantages : Simplicity of construction, absolute accuracy of record, complete record of weight at one operation, a movement that is not affected by dirt, dust or the weather, no type, ink pads, electric battery or clock work, necessity of reading the beam obviated, can be applied to any scale now in use.

The illustration on this page shows a section of a railway track scale beam equipped with the Reed Recording Attachment. The construction, it will be noticed, is as simple as that of the ordinary railway track scale beam, the sliding poises being as free to move as without the Attachment. In the beam are placed puncturing pins at intervals on an incline to correspond to lines of figures on a graduated card. The large poise is provided with a card-holder ; the small poise has a brass casting & a puncturing pin which extends back to the card-hnlder. When weighing a load, a graduated card is placed in the card-holder. After the beam is balanced the holder is pressed toward the beam & the recording pins puncture the card. One movement records the total weight of the load. The card-holder is the only extra movable part over that of the ordinary beam. The correct weight can be had in less time than by reading the beam, & a record is obtained which can be referred to at any time. The Recording Attachment presents a great advantage when weights are in dispute, & the burden of proof will rest upon the party who has no attachment on his scale.

Amendments to the Railway Act.

As it will probably be some little time before the acts passed at the last session of the Dominion House are printed, we give the provisions of the Act to amend the Railway Act in full as follows. It is chap. 23 of the statutes of the session :—

1. The Railway Act, chapter 29 of the statutes of 1888, is amended by inserting, after section 6, the following section :—

"6a. Street railways and tramways, while hereby expressly declared to be subject to such of the provisions of this Act as are referred to in section 4, shall not by reason only of the fact of crossing or connecting with one or other of the lines of railway mentioned in section 306 be taken or considered to be works for the general advantage of Canada, nor to be subject to any other of the provisions of this Act."

2. The said section 6a shall also apply to all electric railways (as distinguished from electric street railways) passing through or over the Queen Victoria Niagara Falls Park, or through or over the property of the province of Ontario lying upon or along the Niagara River & known as the Chain Reserve.

(2.) The said Act is further amended by inserting after section 14, the following sections :—

14a. Whenever proceedings for the drainage of lands have been taken by any landowner under the provisions of an Act of the legislature of any province in that behalf, & it appears to the Railway Committee that an outlet for such drainage works is required over, across or under the lands of the Company, the Railway Committee may, upon the application of the landowner or engineer in charge of the works, or of the clerk of the municipality, & on due notice to & hearing the parties, order the Company to construct & provide upon its lands all necessary means of drainage, as in such order specified, upon the landowner first complying with such terms as to payment or security, if any, for payment of the whole or so much of the cost of construction & maintenance of the said drainage works, as the Railway Committee in such order provides.

14b. Whenever any application is made under the last preceding section or under section 14 of this Act, the Railway Committee may, if it thinks proper, direct an inquiry to be made in the locality in question by a person appointed under section 12 of this Act, & may authorize such person to hear the parties & take evidence under oath, & may also, if it

thinks proper, act on his report without further hearing of the parties.

3. Paragraph (d) of subsection 1 of section 90 of the said Act is repealed, & the following is substituted therefor:

"(d) make, carry or place the railway across or upon the lands of any person on the located line of the railway."

4. Section 117 of the said Act is repealed & the following section is substituted therefor:

"117. Except in accordance with the provisions of section 120 or 130, no deviation shall be made from the located line of railway, or from the places assigned thereto in the map or plan & book of reference sanctioned by the Minister under the provisions of section 124."

5. Section 118 of the said Act is repealed & the following is substituted therefor:

"118. The railway may be made, carried or placed across or upon the lands of any person on the located line, although the name of such person has not been entered in the book of reference, through error or any other cause, or although some other person is erroneously mentioned as the owner of or entitled to convey, or is interested in such lands."

6. Sections 123, 124 & 125 of the said Act are repealed & the following sections are substituted therefor:

"123. The Company shall make, in sections if it so desires, a map or plan & a profile of the line of railway, showing its course & direction, levels, gradient & curvature, & also the open drains & water-courses & the public highways to be crossed or run along or over by such line of railway; & a book of reference shall also be made, giving a general description of the said lands, the names of the owners or occupiers thereof, so far as they can be ascertained, & any other information required by the Minister for the proper understanding of the map or plan & profile.

"124. Such map or plan & profile & book of reference shall be submitted for the approval of, & may be sanctioned by the Minister.

"125. The map or plan & profile, & book of reference, so sanctioned, shall be deposited in the department; & the Company shall also deposit copies thereof, or of such parts thereof as relate to each district or county through which the railway is to pass, duly certified as copies by the Minister or by the deputy, in the offices of the registrars of deeds for such districts or counties respectively."

7. Section 129 of the said Act is repealed, & the following is substituted therefor:

"129. The certificate shall state the particulars of any such omission, & the manner thereof, & shall be deposited with the registrars of deeds of the districts or counties, respectively, in which such lands are situate, & shall be kept by them together with the other documents to which it relates, & thereupon such map or plan, or book of reference, shall be deemed to be corrected according to such certificate."

8. Sections 130 & 131 of the said Act are repealed & the following sections are substituted therefor:

"130. If any alterations are desired in the location of the line of railway as sanctioned as aforesaid, a map or plan & profile of the section of railway proposed to be altered, prepared on the same scale as the original map or plan & profile, & a book of reference, shall be submitted for the approval of, & may be sanctioned by, the Railway Committee, & the same, when so sanctioned, shall be deposited in the department, & copies thereof, or of extracts therefrom, certified by the Minister or deputy, shall, so far as they relate to the several districts or counties affected by such alterations, be deposited with the registrars of deeds of such districts & counties.

"131. The Company shall not commence the construction of the railway until the provisions of sections 124 & 125 are fully complied with, nor shall work be commenced on any alteration of the located line (other than as provided for in section 120) until the provisions of section 130 are fully complied with."

9. Section 217 of the said Act is repealed & the following section is substituted therefor:

"217. All such by-laws, rules & regulations shall be submitted to the Governor in Council for approval. The Governor in Council may sanction them, or any of them, or any part thereof, & may from time to time rescind the sanction of any such by-law, rule or regulation, or of any part thereof. Except when so sanctioned no by-law, rule or regulation shall have any force or effect.

"2. The Railway Committee may, from time to time, appoint competent persons to advise or assist the Committee in the revision of any of such by-laws, rules or regulations, or any other matter coming before the Committee, & any person so appointed may be paid out of the unappropriated funds in the hands of the Receiver-General."

10. The location of each station to be erected on any railway, the construction of which is authorized by any Act of the Parliament of Canada passed subsequent to the first day of June, one thousand eight hundred & ninety-nine, shall be subject to the approval of the Railway Committee of the Privy Council before the Company proceeds to erect such station, & the Company shall erect & maintain a station as so located, with such usual & ordinary facilities as are ordered, unless & except in so far as the Railway Committee from time to time otherwise orders.

11. In the case of a railway not subject to the legislative authority of the Parliament of Canada, but subsidized hereafter in money or in land under the authority of an Act of that Parliament, the payment & acceptance of such subsidy shall be taken to be subject to the covenant or condition (whether expressed or not in any agreement relating to such subsidy) that the company for the time being owning or operating such railway shall, when thereto directed by order of the Railway Committee, confirmed by the Governor-in-Council, erect, maintain & operate a station, with such accommodation or facilities in connection therewith as are defined by the committee, at such point or points on the railway as are designated in such order.

United States Railway Statistics.

From summaries which will appear in the 12th Statistical Report of the Interstate Commerce Commission, being the complete report for the year ended June 30, 1899, for which a preliminary income account was issued in Dec., 1899, the figures in the following advance statement are obtained. Nearly 80 summaries of railway returns appear in the text of the report. For the purpose of localizing statistics data, as a rule, are presented for each of the 10 territorial groups into which the country is divided, as well as for the U.S. as a whole. In the body of the report are the usual tables giving mileage, capitalization, earnings, expenses, etc., by roads.

RECEIVERSHIPS.—The number of railways in the hands of receivers on June 30, 1899, was 71, there being a net decrease of 23 as as compared with June 30, 1898. The number of railways placed in charge of receivers during the year was 16, & the number removed from their management was 39. The operated mileage of the roads under receivers on June 30, 1899, was 9,853.13 miles, of which 7,225.62 miles were owned by them. Of the roads in the hands of receivers on the date named 10 had an operated mileage in excess of 300 miles, 10 between 100 & 300 miles, & 40 less than 100 miles. Complete returns for roads in the custody of the courts are not always available, but it appears that the capital stock represented by railways under receiverships on June 30, 1899, was about $220,210,688; funded debt $306,486,740, & current liabilities $59,180,823. These figures show a decrease of $43,926,703 in capital stock represented as compared with the previous year, & of $16,405,951 in funded debt.

MILEAGE.—On June 30, 1899, the total single-track railway mileage in the U. S. was 189,294.66 miles, an increase during the year of 2,898.34 miles being shown. This increase is greater than for any other year since 1893. The states & territories which show an increase in mileage in excess of 100 miles are Alabama, Arkansas, Georgia, Louisiana, Michigan, Minnesota, Pennsylvania, Texas, Arizona, New Mexico & Oklahoma. Practically all of the railway mileage of the country is covered by reports made to the Commission, the amount not covered being 1,759.98 miles, or 0.93 % of the total single-track milage. The aggregate length of railway milage, including tracks of all kinds, was 252,364.48 miles. The distribution of this aggregate mileage was as follows: single track, 189,294.66 miles; second track, 11,546.54 miles; third track, 1,047.37 miles; fourth track, 790.27 miles; yard track & sidings, 49,685.64 miles.

CLASSIFICATION.—The number of railway corporations included in the report on the Statistics of Railways in the U.S. was 2,049. Of this number 1,064 maintained operating accounts, 843 being classed as independent operating roads & 221 as subsidiary roads. Of roads operated under lease or some other form of contract, 323 received a fixed money rental, 171 a contingent money rental, & 274 were operated under some form of agreement or control not readily classified. The operated mileage of roads merged, reorganized, or consolidated during the year was 5,846.35 miles. The corresponding figure for 1898 was 7,220.42 miles.

EQUIPMENT.—There were 36,703 locomotives in the service of the railways on June 30, 1899, or 469 more than the year previous. Of the total number reported, 9,894 are classed as passenger locomotives, 20,728 as freight locomotives, 5,480 as switching locomotives, & 601 are not classified.

The total number of cars of all classes in the service of the railways on June 30, 1899, was 1,375,916, an increase of 49,742 being shown in this item. Of the total number, 33,850 are assigned to the passenger service, 1,295,510 to the freight service, & 46,556 to the direct service of the railways. It should be understood, however, that cars owned by private companies & firms used by railways are not included in the returns made to the Commission. The report under review contains summaries intended to indicate the density of equipment & the extent to which it is used. It appears that the railways of the U.S. used on the average 20 locomotives & 734 cars per 100 miles of line; that 52,878 passengers were carried, & 1,474,765 passenger-miles accomplished, per passenger locomotive, & that 46,303 tons of freight were carried, & 5,966,193 ton-miles accomplished, per freight locomotive. All of these items show an increase when compared with corresponding items for the preceding year. There was also a decrease in the number of passenger cars per 1,000,000 passengers carried, & a decrease in the number of freight cars per 1,000,000 tons of freight carried.

Both locomotives & cars being embraced in the term equipment, it is observed that the total equipment of the railways on June 30, 1899, was 1,412,619. Of this number 808,074 were fitted with train brakes, the increase being 166,812 & 1,137,719 were fitted with automatic couplers, the increase in this item being 228,145.

Practically all locomotives & cars in the passenger service were fitted with train brakes, & of 9,894 locomotives assigned to that service 6,128 were fitted with automatic couplers. Nearly all passenger cars were fitted with automatic couplers. With respect to freight equipment, it is noted that nearly all freight locomotives were equipped with train brakes & 45% of them with automatic couplers. Of 1,295,510 cars in the freight service on June 30, 1899, 730,670 were fitted with train brakes & 1,067,338 with automatic couplers.

EMPLOYES.—The number of persons employed by the railways of the U.S. as reported on June 30, 1899, was 928,924, or an average of 495 employes per 100 miles of line. As compared with the number employed on June 30, 1898, there was an increase of 54,366, or 21 per 100 miles of line. From the classification of

these employes it appears that there were 39,970 enginemen, 41,152 firemen, 28,232 conductors, & 69,497 other trainmen. There were 48,686 switchmen, flagmen and watchmen. Upon the basis of special returns made to the Commission, it appears that the number of switchmen, flagmen & watchmen included in this aggregate could fairly be assigned in the proportion of 6, 3, & 2 respectively. Disregarding 9,334 employes not assigned to the four general divisions of employment, it is found that the services of 34,170 employes were required for general administration, 287,163 for maintenance of way & structures, 180,749 for maintenance of equipment, & 417,508 for conducting transportation.

The report contains a statement of the average daily compensation of 18 classes of employes for 8 years, beginning with 1892. A summary in the report also gives the total compensation of more than 99% of railway employes for the fiscal years 1895 to 1899. During the year ending June 30, 1899, $522,967,896 were paid in wages & salaries, an amount of $77,459,635 in excess of that paid during 1895. The compensation of the employes of railways for 1899 represents 60% of their operating expenses, & 40% of their gross earnings.

CAPITALIZATION & VALUATION OF PROPERTY.—The amount of railway capital outstanding on June 30, 1899, was $11,033,954,898. This amount assigned to a mileage basis represents a capitalization of $60,556 per mile of line. Of this amount of capital $5,515,011,726 existed in the form of stock, of which $4,323,300,969 was common stock & $1,191,710,757 preferred stock. The amount which existed in the form of funded debt was $5,518,943,172. This amount of funded debt was classified as mortgage bonds, $4,731,154,376; miscellaneous obligations, $485,781,695; income bonds, $260,048,753; & equipment trust obligations, $42,058,348. The amount of current liabilities not included in the foregoing capital statement was $554,330,022, or $3,042 per mile of line.

The amount of capital stock paying no dividend was $3,275,509,181, or 59.39% of the total amount outstanding. The amount of funded debt, excluding equipment trust obligations, which paid no interest, was $572,410,746. Of the stock paying dividends 11.91% of the total amount outstanding paid from 1 to 4%, 7.84% paid from 4 to 5%, 7.41% paid from 5 to 6%, 4.21% paid from 6 to 7%, & 5.18% paid from 7 to 8%. The amount of dividends declared during the year ending June 30, 1899, was $111,009,822, which would be produced by an average rate of 4.96% on the stock on which some dividend was declared. The amount of mortgage bonds paying no interest was $374,460,358, or 7.92%; of miscellaneous obligations, $70,422,403, or 14.50%, & of income bonds, $127,527,985, or 49.04%.

PUBLIC SERVICE.—The number of passengers carried during the year ending June 30, 1899, as shown in the annual reports of railways, was 523,176,508, showing an increase for the year of 22,109,827. The number of passengers carried 1 mile—that is, passenger mileage—during the year was 14,591,327,613, there being an increase in this item of 1,211,397,609. There was an increase in the density of passenger traffic, as the number of passengers carried 1 mile per mile of line in 1899 was 77,821, & in 1898, 72,462.

The number of tons of freight carried during the year was 959,763,583, an increase of 80,757,276 being shown. The number of tons of freight carried 1 mile—that is, ton mileage—was 123,667,257,153. The increase in the number of tons carried 1 mile was 9,589,680,848. The number of tons carried 1 mile per mile of line was 659,565. These figures show an increase in the density of freight traffic of 41, 755 tons carried 1 mile per mile of line.

In the report is inserted a summary of freight traffic analyzed on the basis of a commodity classification, & also a summary indicating in some degree the localization of the origin of railway freight by groups of commodities.

The average revenue per passenger per mile for the year ending June 30, 1899, was 1.925c.; for the preceding year it was 1.973c. The revenue per ton of freight per mile was .724c., while for 1898 it was .753c. An increase in mileage earnings is shown for both passenger & freight trains. The average cost of running a train 1 mile increased nearly 3c. as compared with 1898. The percentage of operating expenses to earnings shows a slight decrease as compared with the previous year.

EARNINGS AND EXPENSES.—For the year ending June 30, 1899, the gross earnings from the operations of the railways in the U.S., covering an operated mileage of 187,534.68 miles, were $1,313,610,118, being $66,284,497 more than for the preceding fiscal year. The operating expenses were $856,968,999, the increase in this item being $38,995,723. The details of gross earnings were as follows:—Passenger revenue, $291,112,993—increase as compared with the preceding year, $24,142,503; mail, $35,999,011 increase, $1,390,659; express, $26,756,054 - increase, $847,979; other earnings from passenger service, $7,687,363 - increase, $463,363; freight revenue, $913,737,155 — increase, $37,009,436; other earnings from freight service, $4,261,804—decrease, $421,401; other earnings from operation, including unclassified items, $34,055,738 —increase, $2,851,958. Gross earnings from operation per mile of line were $250 more than for the year ending June 30, 1898, being $7,005.

The operating expenses of the railways for the year under consideration were assigned as follows: Maintenance of way & structures, $180,410,806; increase, $7,095,848. Maintenance of equipment, $150,919,249; increase, $8,294,387. Conducting transportation, $486,159,607; increase, $21,485,331. General expenses, $38,676,883; increase, $2,200,197; undistributed, $802,454. The operating expenses for the year in question were $4,570 per mile of line, or $140 more than for the previous year. An analysis of operating expenses for the year ending June 30, 1899, according to the 53 accounts embraced in the official classification, appears in the report, with a statement of the percentage of each item in the classified operating expenses for the years 1895 to 1899, inclusive.

The income from operation, or the amount of gross earnings remaining after the deduction of operating expenses, generally designated as net earnings, was $456,641,119, an increase as compared with the year ending June 30, 1898, of $27,288,774. The average amount per mile of line for 1899 was $2,435 & for 1898, $2,325. The amount of income received from sources other than operation was $148,713,983. This amount covers the following items: Income from lease of road, $96,352,295; dividends on stocks owned, $20,104,521; interest on bonds owned, $11,334,690; miscellaneous income, $20,922,477. The total income of the railways, $605,355,102—that is, the income from operation increased by the income from other sources—is the item from which fixed charges & analogous items are deducted in order to reach the amount available for dividends. Total deductions from income amounted to $441,200,289, leaving $164,154,813 as the net income of the year available for dividends or surplus.

The amount of dividends declared during the year, including $80,114 other payments from net income, was $111,089,936, leaving as the surplus from the operations of the year $53,064,877, the corresponding surplus for the year ending June 30, 1898, being $44,078,557.

The deductions from income, $441,200,289, already mentioned, comprise the following items: Salaries & maintenance of organization, $595,192; interest accrued on funded debt, $251,158,087; interest on current liabilities, $7,102,847; rents paid for lease of road, $94,406,737; taxes, $46,337,632; permanent improvements charged to income account, $13,070,045; other deductions, $28,529,749.

In the consideration of the foregoing figures pertaining to income and expenditure it should be held in mind that annual reports of two kinds are made to the Commission by railway companies. Operating reports are filed by such companies as maintain full operating accounts, & financial reports by such companies as have leased their property to others for operation, their own income, apart from that derived from investments, being the annual fixed or contingent rental paid by their lessees, from which they make their own disbursements. From this fact certain items of income & expenditure are necessarily duplicated in comprehensive summaries which are compiled from reports of both classes. These conditions are fully explained by the Statistician in his report, which clearly indicates the extent to which duplications on the side of income & of expenditure exist. As a matter of interest the report contains also an income account of the railways of the U.S. considered as a system. The figures contained in this account are such as would be presented were the railways owned by the Government—operations, tariffs & expenses remaining the same. They eliminate intercorporate payments by making use, where necessary, of balance amounts.

ACCIDENTS.—The total number of casualties to persons on account of railway accidents during the year ending June 30, 1899, was 51,743. The aggregate number of persons killed as a result of railway accidents during the year was 7,123, & the number injured was 44,620. Of railway employes, 2,210 were killed & 34,923 were injured during the year covered by this report. With respect to the three general classes of employes, these casualties were divided as follows: Trainmen, 1,155 killed, 16,663 injured; switchmen, flagmen and watchmen, 273 killed, 2,992 injured; other employes, 782 killed, 15,268 injured. The casualties to employes resulting from coupling and uncoupling cars were, persons killed, 260; injured, 6,765. The corresponding figures for the preceding year were: killed, 279, injured, 6,988. The casualties from coupling and uncoupling cars are assigned as follows: trainmen, killed 180, injured 5,055; switchmen, flagmen & watchmen, killed 74, injured 1,533; other employes, killed 6, injured 177. The casualties resulting from falling from trains & engines are assigned as follows: trainmen killed 337, injured 3,053; switchmen, flagmen & watchmen, killed 60, injured 377; other employes, killed 62, injured 540. The casualties to the same three groups of employes caused by collisions & derailments were as follows: trainmen, killed 280, injured 1,713; switchmen, flagmen & watchmen, killed 14, injured 115; other employes, killed 40, injured 325.

The number of passengers killed during the year was 239, & the number injured was 3,442. Corresponding figures for the previous year were 221 killed & 2,945 injured. In consequence of collisions & derailments, 82 passengers were killed & 1,557 passengers were injured during the year embraced by this report. The total number of persons, other than employes & passengers, killed was 4,674, injured 6,255. These figures include casualties to persons classed as trespassers, of whom 4,040 were killed & 4,730 were injured. The total number of persons killed at highway crossings was 693, injured 1,125, distributed as follows: employes, 19 killed, 38 injured; passengers, 2 killed, 17 injured; other persons trespassing, 170 killed, 168 injured; not trespassing, 502 killed, 902 injured. The number of persons killed at stations was 443, injured 3,306. This statement covers: employes,

killed 83, injured 2,139; passengers, killed 37, injured 580; other persons trespassing, killed 282, injured 444; not trespassing, killed 41, injured 143. The summaries containing the ratio of casualties show that 1 out of every 420 employes was killed & 1 out of every 27 employes was injured. With reference to trainmen—including in the term enginemen, firemen, conductors & other trainmen—it is shown that 1 was killed for every 155 employed & 1 was injured for every 11 employed. One passenger was killed for every 2,189,023 carried, & 1 injured for every 151,998 carried. Ratios based upon the number of miles travelled, however, show that 61,051,580 passenger-miles were accomplished for each passenger killed, & 4,239,200 passenger miles accomplished for each passenger injured.

Conclusion.—The Statistician repeats his previous recommendations to the effect that reports should be secured from express companies engaged in interstate traffic; that reports should be secured from corporations & companies owning rolling stock which is used in interstate traffic; & also special reports from corporations & companies owning depot property, stock yards, elevators & the like; & that reports should be secured from carriers by water, so far as their business is interstate traffic.

It is further stated that nothing has occurred in the administration of the statistical division of the Commission to weaken the confidence expressed in former reports in the proposal that there should be established under the jurisdiction of the Commission a bureau of statistics & accounts, which shall have as its chief purpose the establishment of a uniform system of accounts for the carriers, & that it would be desirable also, should the Commission see fit, to provide for a monthly report of the earnings & expenses of operating railways.

The Purchasing Agents' Guide

To the Manufacturers of & Dealers in Steam & Electric Railway, Steamship, Express, Telegraph & Telephone supplies, &c.

Accident Insurance
Travelers' Insurance Co. ..... Montreal.
Aerated Waters
E. L. Drewry ..... Winnipeg.
Air Brakes & Fittings
Westinghouse Mfg. Co. ..... Hamilton, Ont.
Ales
E. L. Drewry ..... Winnipeg.
Anchors
Rice Lewis & Son ..... Toronto.
Axles
James Hutton & Co. ..... Montreal.
Rhodes, Curry & Co. ..... Amherst, N.S.
Babbit
Rice Lewis & Son ..... Toronto.
Blankets & Bedding
The Hudson's Bay Company .....
Block & Tackle
Rice Lewis & Son ..... Toronto
Boat Fittings & Hardware
Rice Lewis & Son ..... Toronto.
Boiler Covering
Mica Boiler Covering Co ..... Montreal.
Boilers
Polson Iron Works ..... Toronto.
Bolts
Rice Lewis & Son ..... Toronto.
Brake Shoes
F. E. Came ..... Montreal.
Bridge Numbers
Acton Burrows Co ..... Toronto.
Buckets
Rice Lewis & Son ..... Toronto.
Carpets
The Hudson's Bay Company .....
Cars
Rhodes, Curry & Co. ..... Amherst, N.S.
Car Wheels
Rhodes, Curry & Co. ..... Amherst, N.S
Castings
Rhodes, Curry & Co. ..... Amherst, N.S.
Chains
Rice Lewis & Son ..... Toronto.
Cross Arms, Top Pins & Side Blocks
The Firstbrook Box Co. ..... Toronto.
Curtains
The Hudson's Bay Company .....
Cuts
Acton Burrows Co ..... Toronto.
Door Signs
Acton Burrows Co ..... Toronto.
Drills
The Fairbanks Co. ..... Montreal.
Dry Goods
The Hudson's Bay Company .....
Electric Car Route Signs
Acton Burrows Co ..... Toronto.
Emery Wheels
The Fairbanks Co. ..... Montreal.
Enameled Iron Signs
Acton Burrows Co ..... Toronto.
Engines, Stationary & Marine
Polson Iron Works ..... Toronto.
Engraving
Acton Burrows Co ..... Toronto
Toronto Engraving Co. ..... Toronto.
Express Office Signs
Acton Burrows Co ..... Toronto.
Fencing
Page Wire Fence Co. ..... Walkerville, Ont.
Ferry Signs
Acton Burrows Co ..... Toronto.
Flags
Rice Lewis & Son ..... Toronto.
The Hudson's Bay Company .....
Foghorns
Rice Lewis & Son ..... Toronto.
Gas & Gasoline Engines
The Fairbanks Co. ..... Montreal.
Northey Manufacturing Co. ..... Toronto
Gates
Page Wire Fence Co. ..... Walkerville, Ont.
General Supplies
The Hudson's Bay Company .....
Grain Elevators
John S. Metcalfe Co, ... Chicago, Ill.
Groceries
The Hudson's Bay Company .....
Half Tones
Acton Burrows Co ..... Toronto.
Hand & Push Cars
F. E. Came ..... Montreal.
The Fairbanks Co. ..... Montreal.
Hardware
Rice Lewis & Son ..... Toronto.
The Hudson's Bay Company .....
Headlights
Noah L. Piper & Sons ..... Toronto.
Hose
Rice Lewis & Son ..... Toronto.
Illustrations
Acton Burrows Co ..... Toronto.
Iron
Rice Lewis & Son. ..... Toronto.
Iron Signs
Acton Burrows Co ..... Toronto.
Japans
McCaskill, Dougall & Co. ..... Montreal.
Lager Beer, &c.
E. L. Drewry ..... Winnigeg.
Lamps & Lanterns
Rice Lewis & Son ..... Toronto.
Noah L. Piper & Sons ..... Toronto.
The Hudson's Bay Company .....
Launches
Polson Iron Works ..... Toronto.
Life Insurance
Independent Order of Foresters ..... Toronto.
Travelers' Insurance Co. ..... Montreal.
Linoleum and Floor Coverings
The Hudson's Bay Company .....
Locomotives
Baldwin Locomotive Works ... Philadelphia, Pa.
Richmond Locomotive & Machine Works ..... Richmond, Va.
Lubricators
Rice Lewis & Son ..... Toronto.
Lumber
The Haliburton Lumber Company ..... Toronto.
Matches
The Hudson's Bay Company .....
Milepost Numbers
Acton Burrows Co ..... Toronto.
Mohair
The Hudson's Bay Company .....
Numbers
Acton Burrows Co ..... Toronto.
Oakum
Rice Lewis & Son ..... Toronto.
The Hudson's Bay Company .....
Oils
Galena Oil Co ..... Franklin, Pa.
The Queen City Oil Company ..... Toronto.
Signal Oil Company ..... Franklin, Pa.
Office Signs
Acton Burrows Co ..... Toronto.
Packing
The Fairbanks Co. ..... Montreal.
Pipe Covering
Mica Boiler Covering Co. ..... Montreal.
Plushes
The Hudson's Bay Company .....
Pneumatic Tools
F. E. Came ..... Montreal.
Porter
E. L. Drewry ..... Winnipeg.
Portland Cement
Rice Lewis & Son ..... Toronto.
Printing
The Hunter, Rose Co. ..... Toronto.
The Mail Job Printing Company ..... Toronto.
Pumps
Rice Lewis & Son ..... Toronto.
Rails (New)
James Cooper ..... Montreal.
J. J. Gartshore ..... Toronto.
Rice Lewis & Son ..... Toronto.
Rails (for relaying)
James Cooper ..... Montreal.
J. J. Gartshore ..... Toronto.
Rail Saws
F. E. Came ..... Montreal.
Rope
Rice Lewis & Son ..... Toronto.
The Hudson's Bay Company .....
Scales
The Fairbanks Co. ..... Montreal.
Semaphore Arms
Acton Burrows Co ..... Toronto.
Shafting
Rice Lewis & Son ..... Toronto.
Shingles
The Haliburton Lumber Company ..... Toronto.
Shipbuilders' Tools & Supplies
Rice Lewis & Son ..... Toronto.
Ships
Polson Iron Works ..... Toronto.
Shovels
James Cooper ..... Montreal.
The Fairbanks Co. ..... Montreal.
The Hudson's Bay Company .....
Rice Lewis & Son ..... Toronto.
Signal House Numbers
Acton Burrows Co ..... Toronto.
Signals
Noah L. Piper & Sons ..... Toronto.
Signs
Acton Burrows Co ..... Toronto.
Snow Ploughs
Rhodes, Curry & Co. ..... Amherst, N.S.
Spikes
Rice Lewis & Son ..... Toronto.
Station Name Signs
Acton Burrows Co ..... Toronto.
Steamboats
Polson Iron Works ..... Toronto.
Steamboat Signs
Acton Burrows Co ..... Toronto.
Steam Shovels
James Cooper ..... Montreal.
Steel
James Hutton & Co. ..... Montreal.
Rice Lewis & Son ..... Toronto.
Steel Castings
F. E. Came ..... Montreal.
Switch Targets
Acton Burrows Co ..... Toronto.
Switches
F. E. Came ..... Montreal.
Canada Foundry Co ..... Toronto.
Telegraph Office Signs
Acton Burrows Co ..... Toronto.
Telephone Office Signs
Acton Burrows Co ..... Toronto.
Timber
The Haliburton Lumber Company ..... Toronto.
Tires
James Hutton & Co. ..... Montreal.
Tobacco and Cigars
The Hudson's Bay Company .....
Toilet Paper
The Hudson's Bay Company .....
Tools
Rice Lewis & Son ..... Toronto.
Track Jacks
Duff Manufacturing Co. ..... Allegheny, Pa.
A. O. Norton ..... Coaticook, Que.
Track Tools
F. E. Came ..... Montreal.
James Cooper ..... Montreal.
Rice Lewis & Son ..... Toronto.
Tramway Equipment
J. J. Gartshore ..... Toronto.
Trucks
The Fairbanks Co. ..... Montreal.
Rice Lewis & Son ..... Toronto.
Union Couplings
E. M. Dart Manufacturing Co. Providence, R.I.
Varnishes
McCaskill, Dougall & Co ..... Montreal.
Vessels
Polson Iron Works ..... Toronto.
Waste
Rice Lewis & Son ..... Toronto.
Noah L. Piper & Sons ..... Toronto.
The Queen City Oil Co ..... Toronto.
Water Meters
Westinghouse Mfg. Co ..... Hamilton, Ont.
Water Tanks
The Fairbanks Co. ..... Montreal.
Wheelbarrows
James Cooper ..... Montreal.
The Fairbanks Co. ..... Montreal.
Rice Lewis & Son ..... Toronto.
Window Blinds
The Hudson's Bay Company .....
Wines and Liquors
The Hudson's Bay Company .....
Wire & Wire Rope
Rice Lewis & Son ..... Toronto.
Yachts
Polson Iron Works ..... Toronto.

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