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

VOL. I. NO. I. TORONTO, CANADA, MARCH, 1898. $1 A YEAR.

THE

Railway and Shipping World

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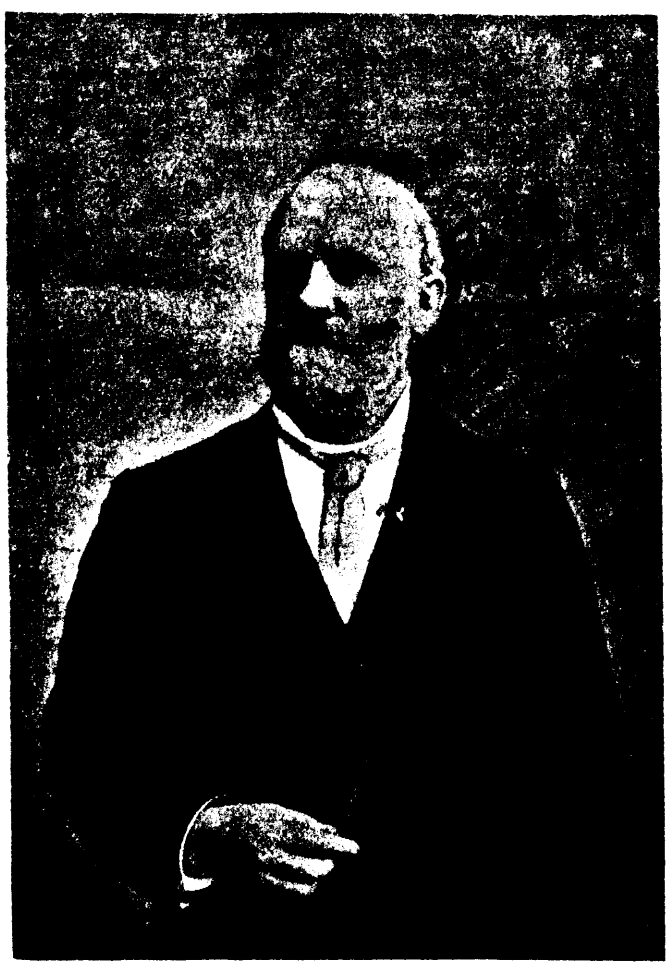
VOL. 1. NO. 1. TORONTO, CANADA, MARCH, 1898. $1 A YEAR.

CANADIAN YUKON RAILWAY.

Report on the Stikine-Teslin Route.

By W. T. Jennings, M. Inst. C.E.

In August last the Minister of the Interior commissioned W. T. Jennings, M. Inst. C.E., of Toronto, to examine the country between Stikine River & Teslin Lake with a view to the construction of a railway line entirely within Canadian territory. Mr. Jennings proceeded to Vancouver, thence up the coast in the Government steamer Quadra, to Wrangel, Alaska, & from there by a small steamer via the Stikine River to Glenora, & on by canoe for 10 miles to Telegraph Creek, at the head of steam navigation, & distant from Wrangel 150 miles, & at an elevation of 540 ft. above sea level. On Sept. 25, Mr. Jennings left overland for Teslin Lake, returning to Telegraph Creek on Oct. 22, after a continuous journey of 350 miles. From Telegraph Creek he returned by canoe, reaching Wrangel Oct. 25. In presenting his report as under, it may be mentioned that this is the first time it has been printed in correct form. When brought down to Parliament as a blue book it was found that it had been hopelessly muddled in the printing, & an order has been given for its reprinting. We wish to acknowledge Mr. Jennings' courtesy in enabling us to give it correctly:



THE HON. A. G. BLAIR, Q.C., M.P., MINISTER OF RAILWAYS AND CANALS.

In reporting on the result of my observations for a railway route between Stikine River & Teslin Lake, I would first refer to the means of communication between the sea & a suggested point of debarkation on the river, by mentioning that the Stikine has been navigated by steamers to Glenora & Telegraph Creek, a distance of from 140 to 150 miles from the sea, since the early 70's when the Dease Lake & Cassiar mining excitement was at its height, but while so navigated during the open season, usually between May 1 & Oct. 20, the journey has almost invariably been considered slow, tedious & not without danger, partly owing to the inferior class of steamers used & partly to the fluctuating state of the water. At times the river is too low for speed with a reasonable cargo, or the stream may be very high & the riffles difficult to make headway against, with the additional danger of drift trees or snags getting foul of the steering gear or wheel. The latter danger is most to be feared where the channel is contracted, such as in Little & Klootchman's canyons, where, if any mishap occurred to the vessel's machinery, she would at once be carried against the rugged rock walls by the swift, swirling, disturbed waters, & sunk by having her planking either torn out or stove in. The 96 miles between Wrangel & Little Canyon can be made by a powerful steamer in 1 day, whereas by reason of the swift & difficult water above it takes 2 days (morning of 2nd day, running in daylight only) more to reach Telegraph Creek, a further distance of only 54 miles, or 150 from the sea; therefore, with these facts before one, it seems reasonable that on a route where safe & speedy transit is contemplated it is advisable to commence the railway well down the valley at a point to be determined on below the Little Canyon & on the left bank of the river 96 miles from the sea.

The route from a point below the Little Canyon, where suitable dock & siding accommodation is to be had, on for 30 miles to a crossing of the river near Shakes Creek, has been laid down on the left side of the river as being the least subject to snow slides owing to the mountain slopes being more distant & less precipitous, & to enable the line to be carried through a depression between the eastern termination of the granite spur through which the Little Canyon extends (in a straight cleft) & the mountain side, thence across the Ok-Sa-Ki-een, a rather formidable mountain stream which will require a pile bridge of at least 100 ft. in length, also protection cribwork; from here to the Klootchman Canyon, some 10 miles from the Little Canyon, the course will be generally over flat lands, & occasional short jagged & sloping points of granite & changed rocks & avoiding as far as practicable by-channels or sloughs, some of which will require to be closed by the introduction of rough cribwork.

At the Klootchman Canyon it is advisable to carry the line at some what higher level than ordinary to ease the curvature & avoid filling in the water where short, sharp indentations in the short line exist.

From the latter point broken flats & occasional rocky points will have to be crossed to reach the left shore at the Grand Rapid (a particularly swift section of the river), where the foot slope of the last spur of the Coast Range proper comes in close proximity to the river. Here a short, strong shed will be required, as it is evident that snow slides annually; passing this spur, a gravel bench will have to be cut into, thence the line will continue over the Doch-da-on, a stream very similar to the one before referred to, & on over bottom lands and along the river's side of an almost isolated ridge of granitic or altered rock facing the clear-water valley, & thence continuing on gravel benches & short, irregular rocky projections & across several minor streams to a point where the river may be crossed by a bridge about 775 ft. in length, placed at such an elevation as will ensure its safety during high waters periods when the water level is fully 15 ft. above its lowest mark.

Should it be desirable at a later date to continue a railway to the vicinity of Dease Lake or to meet a line from the Skeena or Nasse Rivers the ground ahead is favorable for construction at moderate cost. Again, should a route, now being examined by one of my assistants (via the Clearwater) be found practicable, the Stikine would likely be more advantageously crossed lower down the river; however, of the Clearwater route I am unable at present to say more than that the valley of that river appears open & easy as viewed from the Stikine River.

From the crossing of the Stikine to the divide between the Tahltan & the Koketsi streams there is a choice of routes. The first by an immediate & steep ascent along the right slope of the Stikine valley, over rock & gravel formation & through an indentation in the range where Telegraph Creek has

TELEGRAPH CREEK, STIKINE RIVER.

its rise in a regular glade-like pass at an elevation of 3,100 above the river level (at crossing), & distant 27 miles therefrom; thence down the easy pine-clad slope of Arthur Creek to the South Tahltan & on over flats & light rolling ground to Koketsi divide, 19 miles from the pass or 46 from the crossings. The grades on this section, particularly on the Stikine slope, will be severe, reaching in places to 4% to ensure moderate construction cost.

The 2nd route follows the right slope of the Stikine with a gradual rise over better ground than to be had on the Telegraph Creek route, to the eastern or tongue-like end of the range terminating at the confluence of the Tahltans and Stikine rivers, & where the mountains gradually fall away to high rolling timbered hills. The ascent to this point, some 1,200 ft., would be reached in 30 miles, over moderately inexpensive country with gradients which need not exceed 2%.

From this point the route continues along the right slope of the Tahltans, in places in steep & rocky ground, with only such light undulations in the grade line as local circumstances may economically demand, to near the Forks of the Sh. Tahltan where the stream should be crossed & the line continued on easy clay & gravel slopes & benches to the Koketsi divide, or to the same point as described for the 1st or Telegraph Creek route, a total distance of 59 miles from the Stikine crossing & 12 miles longer than by Telegraph Creek.

I would here point out that route no. 2 although longer has several advantages over the other to which due consideration should be given, viz.: the gradients are lighter, so that with the same engine power in about equal time heavier tonnage could be transported to Koketsi. The work of construction would be less per mile. It would approach 12 miles nearer the Dease Lake Disk & Tooya river basin than that via Telegraph Creek, therefore more favorably situated for future extension eastward to Dease Lake, or to meet a line from that district, or the sea coast, via the Naas or Skeena River valleys.

It is also possible that a route from here to Teslin Lake via the Tooya River is to be found, &, as it may be inquired why that country was not fully examined, I would state that the time or means at my disposal was not sufficient to enable me to cover personally, or by assistants available, more country than was examined.

At Koketsi (1,700ft. above the Stikine crossing) there apparently occurs another choice of route for a short distance, & to which I again refer as nos. 1 & 2. No. 1 extends from Koketsi up the valley of the north fork of the Tahltan River to its head, distant, say 6 miles, in Level Mountain (a vast basaltic & gravel covered plateau extending north to the Nahlin River 70 miles) & at an altitude of about 1,600 ft. above Koketsi, thence descending (200 ft.) slightly for 8 miles through a broken, lumpy & irregular looking valley, bounded on the north by the escarpment & slope of Level Mountain, to the head of the Doo-de-dontooya river at M-ea-de-le Lake, a total distance of 14 miles.

The route from the Koketsi divide is through an open valley as far as seen by me (2 miles), but I am informed by an assistant who examined it that towards the head it is a series of canyons & broken, irregular masses of rock intermixed with the gravel on slopes; however, by commencing to rise with a heavy gradient some distance back on the last section it is probable that a line may be obtained above the "canyon" portion of the walls, which are not usually very high in this section. The summit once reached, the descent (as viewed by me from an elevation of 4,000 ft. at Egnalls Mountains) would be made through a section of country apparently composed of broken & disconnected hills as above described.

No. 2, or the alternative route, would be 15 miles from Koketsi to the head of the east branch of Egnalls Creek, with a rise of 1,400 ft., thence in 7 miles a descent of, say 150 ft. to Me-a-de-le Lake, in all 22 miles from Koketsi, or 8 miles longer than no. 1 by the North Fork.

It is evident that with a distance of 15 miles in which to make the rise of 1,400 ft. a much easier grade can be had than by way of the North Fork, but I cannot advise such a course unless the whole of route no. 2 be adopted, when it would be an object to incur the expenditure for additional mileage for the sake of obtaining easier gradients; again, within the limits of this part of the route are several alternative plans.

1st. To keep on easy ground, to the right of the Tahltan to Koketsi divide, thence along the southern margin of the lakes of same name, & crossing the stream at Profile rock, & there commencing an ascent of 9 miles along the side hill to the summit of Egnalls Creek, with a 3° grade, easy curvature & comparatively light work, thence from this point descending to Me-a-de-le Lake over the ground before referred to. 2nd. A line should be tried through a high depression north of Profile rock by commencing the ascent east of the North Fork crossing. 3rd. A minute examination should be made up Quartz Creek ravine, as it appears open to the north.

Only by an instrumental survey, with measured distances, can the proper route in this vicinity be determined, & the base of operations should be established by running up the North Fork & over the summit to Me-a-de-le Lake & returning by Egnalls Creek & the Koketsi to place of beginning.

From Me-a-de-le Lake, for the next 118 miles 1 line is common to both routes, & extends northward in a very direct course for 57 miles to the Nahlin river over flats, glades & gentle slopes in the valley near the base of the western shed of Level Mountain with a small percentage of curvature, easy gradients & light work. For a considerable proportion of the distance the country is timbered with a small growth of spruce, pine, scrub willow & alder, the spruce, however, predominating. The surface of the ground through the whole valley is covered with a deep growth of moss, & in places brush & coarse tufty grass. The soil consists of light clay, sand & gravel, with drift boulders & occasional masses of basalt & limestone.

The 7 or 8 streams passing over are small & unimportant, a short pile trestle being sufficient for each, the names of the largest being the Doo-de-dontooya, Massazooya-Kaka, Tooya & Ka-hak.

The Nahlin River where crossed on the trail is at least 150 x 6, with 1 % fall at flood, & runs in a valley, & is about 1,200 feet wide, 50 ft. deep, with 1 1-2 to 1 slope, but where the line is projected at a point some 4 miles above the trail crossing, it runs in a much contracted V-shaped trough about 100 deep & 350 wide.

FIRST CANYON ON STIKINE RIVER ABOVE TELEGRAPH CREEK.

At the Nahlin River, Level Mountain or plateau terminates, but the high ground continues northward in a more elevated, irregular & mountainous form; & it is at the foot of its western slope & bordering the eastern edge of an extensive marsh & lake district called Grand Valley that the line is projected in a northerly course to a regular, easy rolling bench area reaching from the Cascades of White Swan River to & along the margin of Teslin Lake. On the section of 67 miles between the Nahlin & Teslin Lake several streams are crossed, but none of such importance as to require more than an ordinary pile structure. The soil is principally of a sandy gravel nature & very little rock will be met with on the location line.

From the Cascades & to the end of a river (which I have named White Swan) flowing into the extreme South of Teslin Lake, northward for many miles the slightly undulating gravel bench land covered with small spruce, etc., continues; therefore the point for a terminus need not now be defined, beyond the statement that it should be situated north of the shallow narrows & on the open portion of Teslin Lake at least 10 miles beyond where White Swan River enters its estuary-like southern end, thereby ensuring a longer season of navigation, as the shallow, contracted portion doubtless freezes over some weeks before the lake. As Teslin Lake & its outflowing river of same name will form the subject of another section of this report, I will only say that both lake & river are favorable during the open season for navigation by steam & other craft.

Should the Clearwater Valley prove favorable for railway or road construction, a very considerable saving in distance will be effected to Egnalls Mount, where the line may be united with any one of the routes above described, or it can be carried down the Sheslay River, some 10 miles, & through a gap near the north end of Hearts Mountains to the Doo-de-dontooya River, thence to a junction with the first line.

Provided all arrangements are made & the location determined upon by April, 1898, the line of railway by either route shown on the plan can be completed & in operation by September, 1898, at a cost of $4,000,000, that portion situated on the Stikine River below the crossing, including the bridge, costing $746,000 of the total amount.

Estimates.

PERMANENT WAY, MATERIALS, &C., REQUIRED FOR 1 MILE OF RAILWAY TRACK, &C., IN POSITION ON FORMATION.

Steel rails, 56 lb. a l. yd., 88 tons, $30		$2,640 00
Angle plates, 2 ft. long, 18 lbs. each, 176 joints, 4 bolt holes, 704 plates (@ 18 lbs., 12,600 lbs. (@ 2 cts		252 00
Bolts, ¾-in., round, oval neck, 1 lb. each, 1,408 lbs. (@ 3½ cts		49 28
Spikes, 5½x9-16 in., 6,000 lbs. (@ 2½ cts		150 00
Ties, spaced, 2 ft., centre to centre, 3 ft. 6 in. by 8 in. face, 2,640 (@ 25 cts		660 00
Washers, rubber		25 00
		$3,776 28
Tracklaying per mile	$250 00	
Ballasting per mile, 2,000 cubic yds. (@ 40 cts	800 00	
		1,050 00
Total		$4,826 28

Steel rails, 70 lbs., 110 tons (@ $30		$3,300 00
Angle plates, 30 lbs., 704 plates, 21,120 lbs. (@ 2 cts		422 40
Bolts (6 bolts) 1 lb. each, 2,108 lbs. (@ 3½ cts.		73 98
Spikes, 5½x9-16 in., 6,500 lbs. (@ 2½ cts		162 50
Ties, 2,640 (@ 25 cts		660 00
Washers		25 00
		$4,643 88
Tracklaying per mile	$250 00	
Ballasting, 2,000 cubic yds. (@ 40 cts.	800 00	
		1,050 00
Total		$5,693 88

COST OF CONSTRUCTING ONE MILE OF ROADBED.

LIGHT WORK.

Clearing 9 acres (@ $25	$225 00
Close cutting 2 acres (@ $35	70 00
Grubbing 2 acres (@ $50	100 00
Earthwork, 15,000 yds. @ 25 cts	3,750 00
Rockwork, 1,000 yds, @ $1	1,000 00
Structures	800 00
Engineering, $600; stations, &c., $150; water supply, $150; telegraph line, $110	1,010 00
Sidings	350 00
	$7,305 00
Contingencies 10 per cent	730 50
	$8,035 50
Permanent way: Light rails, 56 lbs	4,826 28
Total	$12,861 78

HEAVY WORK.

Clearing 9 acres (@ $20	$180 00
Close cutting 2 acres (@ $30	60 00
Grubbing ½ acre (@ $50	25 00
Earthwork, 20,000 cubic yards at 25 cts	5,000 00
Rockwork, 20,000 " $1	20,000 00
Structures	1,000 00
Engineering, $700; telegraphing, $110; stations, &c., $150; water supply, $150	1,110 00
Sidings	400 00
	$27,775 00
Contingencies 10 per cent	2,777 50
	$30,552 50
Permanent way, heavy rails, 70 lbs	5,693 50
Total	$36,246 00

MEDIUM WORK.

Clearing 9 acres (@ $25	$225 00
Close cutting, 3 acres (@ $35	105 00
Grubbing, 2 acres (@ $60	120 00
Earthwork: 4 ft. bank, 15 ft. base, 3,000 ft., 9,330 ft. (@ 25c	2,332 50
Rockwork: 5 ft. cut, 22 ft. base by ¼ to 1 slope, 2,300 ft., 10,350 ft. (@ $1	10,350 00
Structures	1,000 00
Engineering, $700; telegraph lines, $110; stations, etc., $150; water supply, $150	1,110 00
Sidings	400 00
	$15,642 50
Contingencies, 10 per cent	1,564 25
	$17,206 75
Permanent way, light rails, 56 lbs	4,826 28
Total	$22,033 03

STIKINE RIVER SECTION—30 MILES, CLASSED AS MEDIUM.

30 miles of railway line complete (@ $22,000	$660,000 00
Dock, sidings and freight house	6,000 00
Bridge over river	80,000 00
Total	$746,000 00

WHOLE SECTION, STIKINE RIVER TO TESLIN LAKE.

30 miles as above	$746,000 00
125 miles, light, (@ $13,000	1,625,000 00
30 miles, heavy, (@ $36,000	1,080,000 00
23 miles, medium, (@ $22,000	506,000 00
208 miles, say $19,000 a mile—	
Grand total	$3,957,000 00

STIKINE RIVER AND TESLIN LAKE ELECTRIC RAILWAY. LENGTH—165 MILES.

Five power stations complete with hydraulic plant, &c. Twenty large cars fitted with 4 motors each Railway line fitted with feed and other wires, etc. Dynamos and boosters Railway line-light rail Wharf at each end and also freight houses Two construction engines and 40 cars	$2,850,000 00

ANNUAL COST OF OPERATION.

For 6 months	$ 55,000 00	
Interest and depreciation on cost $2,850,000 at 10%	285,000 00	
Total		$ 340,000 00
Say 3 steamers ply on Stikine, bringing on average 100 prospectors a day for 4 months —12,000 passengers— 165 miles rail haul at 5c. a mile—$8.25	$ 99,000 00	
And ¼ of a ton of freight per man—9,000 tons at $50 a ton	450,000 00	
		$ 549,000 00
Expenses as above		340,000 00
Profit and loss		$ 209,000 00

Then follows a report on a track survey & examination of Teslin Lake & Hootalinqua River, by A. St. Cyr, D.L.S., for which we have not room in this issue.

Mr. Jennings also reports on 4 other railway routes as follows:—1. From Chilkat or Dyea Inlets to the Yukon River via Nordenskiold River, 245 miles, the cost of which, with all appliances for business, he estimates at $5,635,000 or $23,000 a mile.

2. From Dyea via Chilkoot Pass to Tagish Lake and thence to Hootalinqua River, 111 miles. Estimated cost $3,030,000 or $27,318 a mile.

3. From Skaguay via White Pass to Tagish Lake, thence to the Hootalinqua River, 123 miles. Estimated cost $3,236,000 or $28,300 a mile.

4. Via Taku Inlet and Nakinka River to Teslin Lake, 145 miles. Estimated cost $3,485,000 or $24,034 a mile.

Mr. Jennings also reports on a route for a trail from the Stikine River to Teslin Lake, & gives a lot of valuable information in regard to freighting.

The Contract with Mackenzie & Mann.

On Jan. 25 the Dominion Government, represented by the Ministers of Railways & Canals & of the Interior, entered into a contract with Wm. Mackenzie, of Toronto, & D. D. Mann, of Montreal, for the construction of a railway from the Stikine River to Teslin Lake. Following is a copy of the contract divested of a little of its legal verbiage:—

1. The contractors to lay out, construct, equip & fully complete a railway with proper terminal facilities from the navigable waters of the Stikine River in B.C., at or near the mouth of Telegraph Creek, Glenora, or the mouth of Clear Water River, northward to the navigable waters of Teslin Lake, a distance of about 150 miles, on or before September 1, 1898, the railway when fully completed to be of the general standard & guage of the Kaslo & Slocan Ry. in B.C., & according to specifications to be approved by the Minister of Railways.

The railway shall be the property of the contractors but shall be subject to inspection & approval by an engineer to be named by the Minister of Railways before being accepted as complete by the Government.

For the purposes of the season of 1898 & of complying with the requirements of this contract in respect to the completion of the line on or before September 1, it shall be sufficient if, on or before that date, the contractors have the rails laid in such a manner as will permit of regular & efficient operation of the railway, although the whole work be not fully completed, & if the railway be sufficiently equipped for such operation. The location of the railway between the points mentioned shall be such as the contractors may decide upon without filing plans thereof prior to completion, provided that the grant of land hereby contracted for shall not be made upon a larger mileage than the Minister of Railways considers reasonably necessary for traversing the distance between the terminal points.

2. The Government shall submit to Parliament at its next ensuing session a measure for the necessary Act confirming this agreement & authorizing the Government & the contractors to carry it out, also incorporating the contractors & such others as may become shareholders into a company under the name of the Canadian Yukon Ry. Co. or other name approved by the contractors, with power to acquire & carry out this agreement, & with all necessary powers to build & operate the railway & an extension thereof northward to Dawson City or thereabouts & an extension southward to a point in B.C. to be designated by the Government & capable of being made an ocean port, also a railway from the waters of Lynn Canal to Port Selkirk or thereabouts,

by way of Chilkat Pass, also branch lines of railway from any points on the Co's railways to any property owned by the Co., also lines of railway from any navigable waters to any property owned by the Co.: Provided that the power to build the line from Lynn Canal to

MR. WILLIAM MACKENZIE.

Port Selkirk & the branch lines & lines from navigable waters shall not be exercised without the consent of the Governor-General-in-Council.

The Act of Incorporation to give the Co. sufficient powers to build & otherwise acquire & operate docks, wharves & lines of steam & other vessels in connection with its railways & property, also telegraph & telephone lines, also to carry on mining and smelting operations & such other powers as may be necessary to operate & conduct all business connected with & incidental to the development & working of the lands (to be granted by the Government as hereinafter provided) & the minerals therein, including power to issue land grant bonds & bonds secured by the Co's undertakings.

3. Upon the incorporation of the Co. & upon the assignment by the contractors to such Co. of this agreement & upon the Co. covenanting with the Government to carry out the same, & upon the railway from Stikine River to Teslin Lake being completed & accepted, the contractors shall be relieved from personal responsibility hereunder & the Co. shall be thereafter deemed to be the parties of the second part hereto in lieu of the contractors & shall be bound as such, & be entitled to their rights hereunder.

4. For 5 years from September 1, 1898, no line of railway shall be authorized by Parliament to be constructed from Lynn Canal or thereabouts or from any point at or near the International Boundary between Canada & Alaska into the Yukon District, & for five years from said date no aid in land or money shall be granted to any person or company other than the contractors & the contractors' Co. to assist in building any such railway.

5. The contractors & the contractors' Co. shall be entitled to receive in preference to any other person or company during 10 years from September 1, 1898, such aid or assistance in land or money as the Government may be authorized & may see fit to grant in aid of a line of railway from the Stikine River to an ocean port in B.C., provided that the contractors or contractors' Co. are willing to undertake construction of same at once & completion thereof within a reasonable time upon receiving notice from the Government.

6. The tolls to be collected by the contractors or contractors' Co. upon the railway between Stikine River & Teslin Lake shall be 1st fixed by the Governor General in Council, & shall not be liable to reduction until the railway has been in operation for 4 years, but the tolls shall be reduced by the Governor in Council by 25% from & after such 4 years, & after the railway has been in operation 7 years they shall be reduced by 25% off the tolls as previously reduced, but after the railway has been 10 years in operation the tolls shall be subject to the general railway laws of Canada in that behalf.

7. The land granted to the contractors or contractors' Co. hereunder shall be free from taxation for 10 years from the granting thereof, except municipal taxation by an incorporated city, town or village within the Yukon Provisional District.

8. The contractors shall immediately construct a practicable sleigh road from the mouth of Stikine River to Teslin Lake & shall provide suitable shelters or stopping places for travellers at intervals of not more than 25 miles along the road, the road & stopping places to be available for use at the earliest possible moment & in any event not later than 6 weeks from the execution of this agreement.

9. The contractors or contractors' Co. shall provide or arrange with others to provide steamboat transport of freight & passengers between the terminus of the railway on Teslin Lake or other terminus northerly thereof and Dawson City to & fro.

10. The contractors shall within 10 days after the execution hereof deposit with the Government in cash or approved cash security $250,000 as security that the railway from Stikine River to Teslin Lake will be completed & equipped in accordance with the terms hereof, & on the railway being completed & equipped & accepted the security shall be returned to the contractors, & if it be deposited in cash, interest at the rate of 3 per cent. per annum thereon shall be paid for the time it has been deposited.

11. In aid of the construction of the railway from Stikine River to Teslin Lake the Government shall grant to the contractors for each mile of railway 25,000 acres of land to be selected as hereinafter mentioned from the Yukon Provisional District & from that part of the Northwest Territories of Canada lying west of the Mackenzie River and Liard River & north of the 60th parallel of latitude, such land to be vested in the contractors upon the railway being completed and accepted as complete by the Government & upon the land being selected as hereinafter set forth.

12. The lands shall be selected by the contractors along base lines & the base lines may be of two kinds: 1st. The contractors may take as a base line a line which will correspond with the general course of any lake, river, stream or watercourse, such line to be determined by survey or approximate survey

MR. D. D. MANN.

to the satisfaction of the authorized agent of the Minister of the Interior, & to follow the general course of the lake, river, stream or watercourse for the required distance. The contractors may take as a base line a line commencing at any point located by them &

running from such point due north, east, south or west. The land along a base line shall be divided into blocks, each block to extend 3 miles along the base line & to extend 3 miles backwards on each side of the base line. On each base line there shall be at least 8 of such blocks, but there may be more at the option of the contractors. These blocks shall be numbered from 1 up consecutively; the odd-numbered blocks shall be the property of the contractors; the even-numbered shall remain the property of the Government. The contractors shall take at least 4 blocks on each base line established by them for the purpose of selection, but shall not be bound to take more, but they may take as many more as they desire & as circumstances permit. Thus upon each base line so established there shall be laid out a tract not less than 24 miles along the course of the base line by 3 miles on each side thereof in width, making 8 block of 3 miles by 6 miles. Provided that if in the selection of lands along any base line the courses thereof prevent rectangular blocks being laid out, the blocks shall be adjusted to the required angles, preserving as far as practicable blocks of an area of 3 miles by 6. Any shortage or surplus of such area shall be adjusted by the prolongation or shortening of such base line. The contractors may also at their option select additional blocks lying on either end of any odd-numbered block along a base line, but such additional blocks must be 3 miles square each and they shall not exceed 3 in number on each end of each such odd-numbered block.

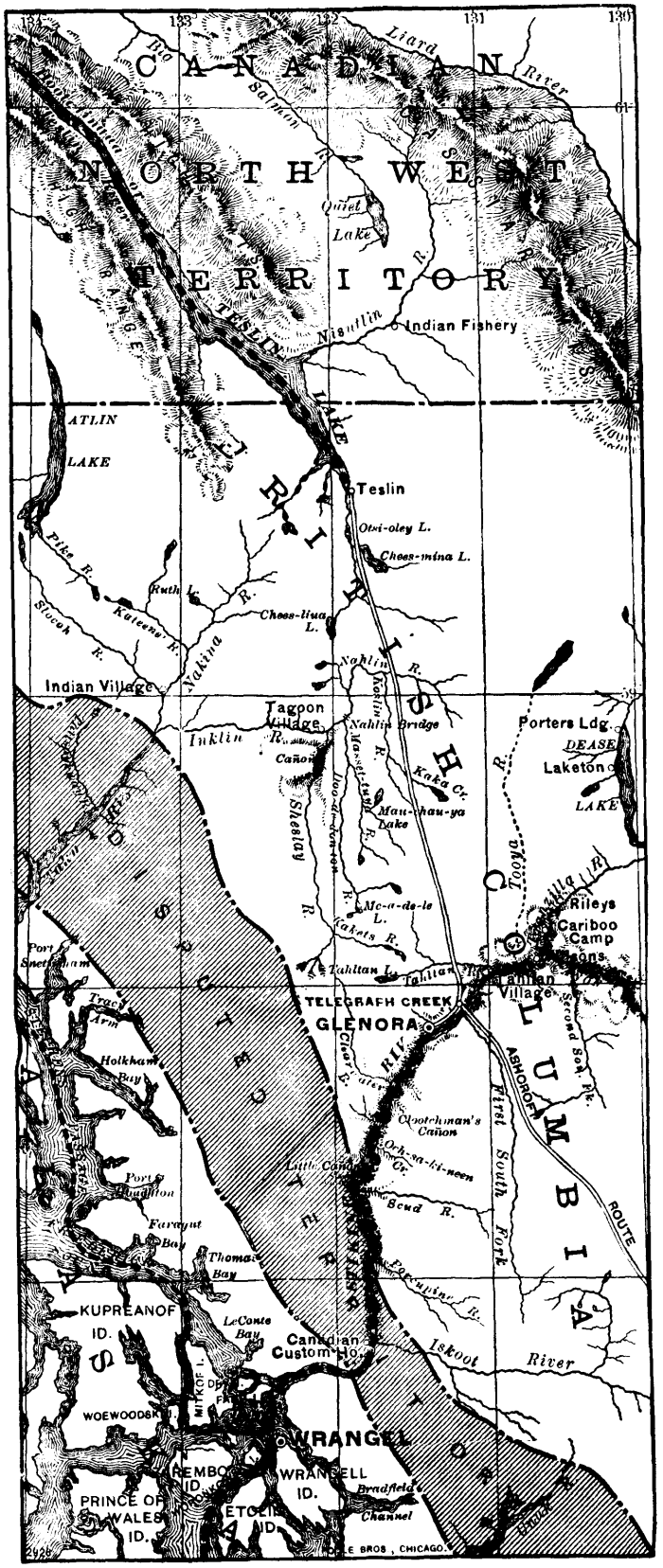
13. The contractors shall make selection of ½ of the lands to which they become entitled under this contract within 3 years from September 1, 1898, & of the remainder within 6 years from that date.

14. No portions of the beds of the Rivers Yukon, Lewes or Hootalinqua, or of the lakes Teslin, Bennett, Tagish, Labarge or Marsh (said lakes & rivers forming continuous water-courses) or of the banks thereof for 25 ft. on each side from ordinary high water mark, shall pass to the contractors under any selection of lands made under the agreement.

15. The free rights of passage and use along navigable or floatable streams within the lands selected by the contractors shall not be impeded by them, & if any stream be diverted by them from its natural channel an equally convenient navigable or floatable channel shall be provided in lieu, & the Gold Commissioner of the district shall decide any dispute which may arise as to whether such equally convenient channel has been provided & from his decision there shall be an appeal to the Governor General in Council.

16. Any & all mining claims actually held & recorded pursuant to Government regulations by a free miner or free miners & being within a block of land taken or selected by the contractors, shall be excepted from the grant & shall not pass to the contractors, provided that such claims have been so actually held & recorded prior to the base line, along or with reference to which such block is taken, being actually run & marked on the ground by the contractors.

17. There shall be payable to & reserved by the Government a royalty of 1 per cent. upon all gold mined by placer or alluvial or hydraulic mining upon the lands selected hereunder, & if & so long as any royalty up to 1 per cent. is levied by the Government upon all gold got by quartz mining in Government land in the Yukon district, a royalty of an equal amount up to 1 per cent., but no more, shall be payable to & reserved by the Government upon all gold got by quartz mining in the land selected hereunder.



THE CANADIAN YUKON RAIL AND RIVER ROUTE.

18. So soon as any 10 continuous miles of the railway between Stikine River and Teslin Lake have been completed & in running order, & certified so to be by an officer named by the Minister of Railways in that behalf, the contractors may select 92,160 acres, or 2 blocks of land hereunder, & thereupon such blocks shall be reserved by the Government from sale or location or free miners' claims, & upon the completion from time to time in a similar way of any other 10 miles, the contractors shall have a similar right to select 92,160 acres, or 2 blocks, which shall thereupon be similarly reserved, & upon the completion of the railway & acceptance thereof by the Government as completed, the blocks so reserved shall be granted to the contractors, all free miners' claims being excepted, as provided by clause 16.

19. In case any land is excepted out of blocks taken by contractors on account of free miners' claims, or otherwise, the quantity so excepted shall not be counted in the acreage of lands to which the contractors are entitled hereunder.

20. The contractors shall upon application sell to actual settlers for farming purposes, at prices to be fixed by the Governor in Council, any arable lands forming part of those selected hereunder. Provided, however, that upon such sale all minerals & the right to mine same shall be reserved, & this clause shall not extend to lands suitable for village or town sites.

21. So soon as the contractors notify the Minister of Railways to send an engineer to inspect & approve of any 10 miles of the railway, such engineer shall be sent without delay to make such inspection, & shall thereafter remain ready to inspect such each 10 miles, until the whole line is completed.

22. The grants of lands selected by the contractors shall be in fee simple, & shall include all precious metals & all minerals whatever, reserving only the royalties above provided for.

23. Provision shall be made in the Act incorporating the contractors' Co. against any discrimination by such Co. in operating its railways between customers, whether by discriminating rates or treatment or otherwise, or by means of its steamships or other connections or otherwise.

24. Water available for hydraulic or placer mining on the contractors' lands, or on Government lands, shall be used by those mining on such lands under such regulations as may be established by or under the authority of the Governor General in Council for the purpose of securing an equitable & fair division & use thereof.

25. This contract shall be subject to the approval of Parliament.

Mr. Jennings' estimates, on page 3, are for a standard gauge railway, equal to that required of bonused railways by the Government, & as if done under a manager of construction acting for the Government.

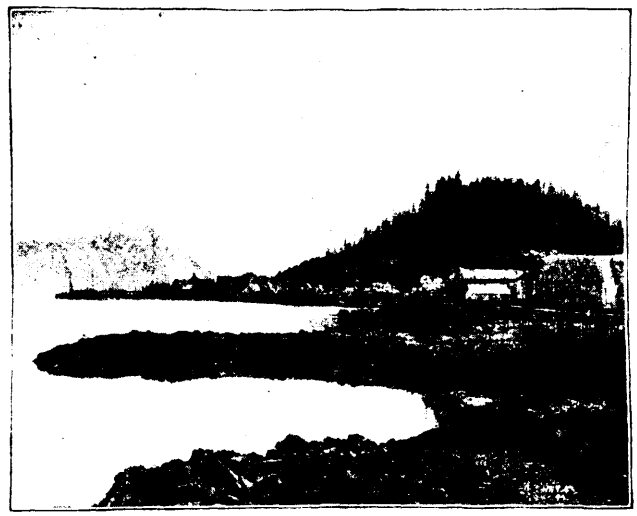
The Construction of the Line.

Directly the contract with the Government was signed, Messrs. Mackenzie & Mann made heir construction arrangements with characteristic promptness. Mr. Mann at once left for the Pacific coast, establishing his headquarters at Vancouver, & was followed a day or two later by T. H. White, C.E., of St. Thomas, Ont., well known in connection with C.P.R. construction work, particularly that of the Pasqua branch in Assiniboia, J. H. Kennedy, C.E., and E. E. Weldon accompanying him as assistants.

One of Mr. Mann's first moves was to charter R. Dunsmuir & Sons' steamer Joan to transport men & supplies from Vancouver to Wrangel, & to secure a Canadian island north of the entrance of the Portland Canal for a point of transhipment.

Mr. Mann stated to press representatives that the first thing to be done was the construction of a sleigh road through to Teslin Lake. The first party to go north consisted of some 200 or 300 men & 50 or more teams to establish camps at regular intervals of 25 miles. It is the intention to make this road a permanent winter route, & at these camps accommodation will be furnished for travellers and horses similar to that provided at any ordinary stage route hotel. Arrangements were at once made for an exploratory survey of the country, to locate the line & get timber.

According to Mr. Mann, by the time navigation on the Stikine River opens, which will probably be before May 1, a portion of the line will be graded & ready for the rails, & these & the rolling stock, which have been ordered in the East, will be taken up. The force of men will be increased as soon as a larger number can be worked to advantage, & by the time construction work is well started at least 4,000 men will be employed. "As you are aware," said Mr. Mann, "we have to complete the line according to the terms of our contract with the Government by September 1, & shall thus have to do some speedy work. In fact, it will probably be the quickest job in railway construction ever carried out on this continent. We will pay our men good wages and will employ as many local men as possible, but owing to the short time allowed for the work & the number of hands required we shall have to get men from outside places as well. Taking May 1 as the date of the opening of navigation, we will have 120 days in which to lay between 140 & 150 miles of railway. According to the contract we have to furnish transportation from the mouth of the Stikine River to Dawson City, & shall thus run steamers on both the Stikine and Teslin Lake and Hootalinqua River. These are now being built in the East and will be brought out in sections and put together here. Of course, a large amount of supplies will be needed, & these will be principally bought in Vancouver & Victoria, in both of which places we shall open offices."



WRANGEL AS IT WAS.

Mackenzie & Mann have purchased from the Great Falls & Canada Ry. 80 miles of narrow-gauge rails, 4 locomotives and a number of cars, to be used in the construction & operation of the new road.

The men constructing the sleigh road to Teslin Lake are under the superintendence of Neil Keith, a well-known western contractor. As soon as the railway line is located 1,000 more men will be sent in to grade, & it is expected 4,000 men will be employed altogether. The contractors expect to put through some 250,000 or 300,000 tons of supplies this year.

"I believe," said Mr. Mackenzie recently, referring to hostile United States legislation, "that everything will be arranged amicably. In any event, Canadians have a right to navigate the Stikine River, & steamboats can ply on it for 5 months of the year. We have three outfits already and the line is being located. Until this work is completed there is no necessity for rushing men north. We begin track-laying operation in April. At least 4,000 men will be employed. It is probable that the Government will eventually extend the projected Teslin Lake road southward to a point on the Canadian seaboard, for instance, to a point on the Alice Arm, or on the Portland Canal."

Act to Confirm the Contract.

Within a few days after the opening of Parliament last month the Minister of Railways introduced a bill to confirm the contract & to incorporate W. Mackenzie, D. D. Mann & Roderick J. Mackenzie, & such others as may become shareholders, as The Canadian Yukon Railway Co., with head office in Toronto, or such other place in Canada as the directors may select & with a capital stock of $10,000,000, in $100 shares, subject to increase under certain circumstances. When not inconsistent with the provisions of the bill, the Railway Act and amendments to apply to the Co's. railways, but section 57 of that Act is not to apply to Mackenzie, Mann & Mackenzie, or to their executors or administrators. The directors are authorized to create preference stock. Section 89 of the Railway Act, which prohibits companies dealing in the shares & securities of other companies, is not to apply to this Co. Powers are given as to owning & operating steamers, docks, elevators, or to acquire & operate mines, make & supply electric light, heat & power, & construct & operate telegraph & telephone lines. Bonds, etc., not exceeding $25,000 a mile may be issued & additional issues may be made, secured by mortgage on lands.

The bill gave rise to a long debate, in which the contract was vigorously denounced by all the Conservative speakers with one exception, and an amendment protesting against it was moved. At the time of writing (Mar. 5) the debate is still in progress.

VICTORIA JUBILEE BRIDGE.

The Grand Trunk's New Structure at Montreal.

On May 4 last work was begun on the replacing of the famous tubular Victoria bridge over the St. Lawrence River at Montreal, by truss spans, to be known as the Victoria Jubilee Bridge. Work has proceeded so satisfactorily that the masonry of the abutments & 18 piers has been completed. One span of the superstructure at the west end of the bridge is in place & the larger part of the material for the remaining spans is manufactured and ready for erection.

It has been popularly supposed that Robert Stephenson, the famous English engineer, designed the Victoria bridge, but the late Myles Pennington, in his "Railways & Other Ways," says that while Stephenson was the consulting engineer, to Alex. M. Ross must be given the credit of being the suggester, planner & designer of the structure. Mr. Ross had been connected with many railways & public works in Great Britain before he visited Canada. He came here on behalf of English capitalists in 1852. John Young, Commissioner of Public Works for Quebec, pointed out to Mr. Ross the importance of bridging the St. Lawrence. Mr. Ross, after inspecting the locality, suggested the construction of an iron tubular bridge, & returned to England in the fall, carrying with him soundings & plans of the bridge as designed & located by him. In August, 1853, a complimentary dinner was given to Robert Stephenson at Montreal, when he acknowledged that an abundance of information had been brought to him in England by his esteemed friend Ross, & that he was able to get a good idea of what the bridge was to be before he came to Canada. He added that it was one of the proudest days of his life when he was called to confer with the engineers of the G.T.R. on bridging the St. Lawrence.

The construction of the bridge was an undertaking of great engineering & practical difficulties, but money, perseverance & skill overcame them all. Mr. Pennington gives some idea of the discouragements which were met with. The contractors had to contend with a roaring rapid 2 miles wide, shoves of ice from 3 to 7 ft. in thickness & from 15 to 20 square miles in extent, coming along slowly but surely, with a pressure of millions of tons. Before building a cofferdam wherein to erect a stone pier it was necessary to put down above the site mooring cribs to hold barges & steamboats in position while the building of the cofferdam was in progress. One winter a large staff was employed cutting holes in the ice & putting down wooden cribs which were weighted with heavy blocks of stone. This was done to save time in spring, but when the ice shove came it cleared away all the cribs & carried the stone into the very spot where the cofferdam was to be erected. Thus the whole winter's work, instead of being of any advantage, was attended with very much loss, both in time & money, for in the spring new cribs had to be put down, & the stones strewn over the bottom of the river had to be fished up one by one before the building of the cofferdam could be commenced. The stone for the first pier was laid July 22, 1854, by Sir Cusack Roney. On November 24, 1859, Vice-President Blackwell of the G.T.R., Attorney-General Cartier, of Quebec; Jas. Hodges, Superintendent of the bridge construction; A. M. Ross, Engineer; W. Shanley, Major Campbell, Messrs. Gzowski, Macpherson, Forsyth, Captain Rhodes & others were the first to cross the St. Lawrence by the new bridge. Mr. Blackwell was on his way to England to attend the Grand Trunk meeting, & was able to report himself as coming via Victoria Bridge. On August 25, 1860, the last stone was laid & the last rivet driven by the young Prince of Wales, on which occasion a grand banquet was given near the bridge, at which addresses were delivered by the Prince, the Duke of Newcastle & others. To commemorate the event Mr. Blackwell presented a gold medal to the Prince & bronze medals to the officers of the G.T.R. The bridge cost $7,000,000, which sum has been largely augmented by the cost of alterations & repairs.

The tubular form of bridge, then already in use for the railway bridge over the Menai Straits in Wales, was adopted. The tubes were constructed of boiler iron & were 16x20 ft. in sectional area, with a simple plate floor & roof, instead of the cellular construction adopted in the Menai Bridge. The bridge is 9,144 ft. long, the total length of the ironwork being 6,592 ft. There are 24 piers & 2 abutments, containing 100,000 cu. yds. of masonry, the thickness of the piers at the water line being 18 ft., except for the 2 piers of the channel span, which are 28 ft. wide. There are 25 spans, 24 of these ranging from 242 to 247 ft. in length, and the centre or channel one having a length of 330 ft. The height from the water to the bottom of this tube is 60 ft., & the bridge has a grade of 1 in 130 from each end to this span. The total weight of iron in the tubes is 9,044 tons, & the area for painting in each coat was 32 acres. The greatest depth of water is 22 ft., & the average rate of the current is 7 miles an hour. The contractors for the bridge were Peto, Brassey & Betts. Fig. 1 is a general view of the bridge. Fig. 2 shows in more detail some of the end spans, with the iron casings of the ends of the tubes, which form refuges for the trackmen. It also shows the side openings for ventilation.

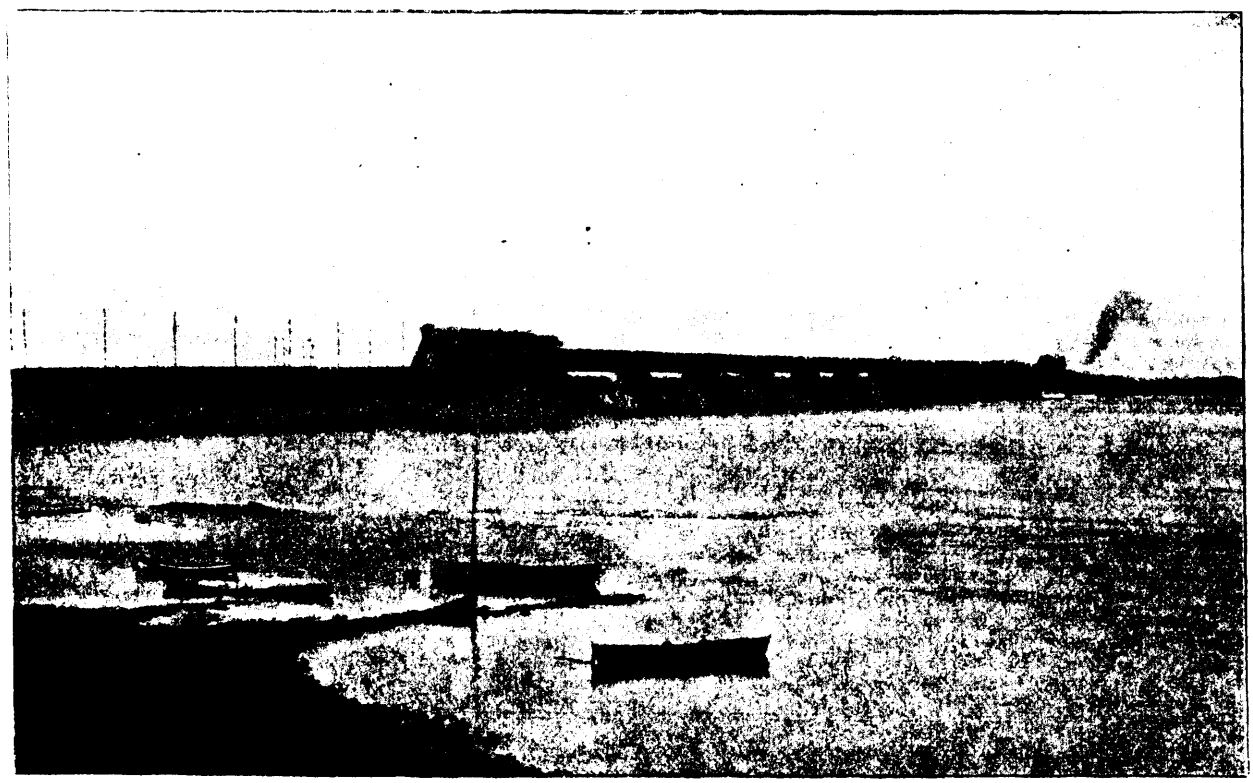


FIG. 1.—THE VICTORIA TUBULAR BRIDGE.

The smoke and gases from the locomotives in this long iron tunnel made the atmosphere very foul, and within recent years a strip of the plating along the centre of the roof was removed, the roof being reinforced by riveting angle irons along each side of the opening. Rust & corrosion (from the products of combustion, damp, & the drippings of brine from refrigerator cars) have made inroads upon the ironwork, & while these did not reach such an extent as to impair the safety of the structure, yet they, in conjunction with the incapacity of the single track bridge to provide properly for all the traffic, led the Company to decide upon erecting a new superstructure, which has been designed under the direction of the Company's Chief Engineer, Jos. Hobson, to whom THE RAILWAY & SHIPPING

WORLD is indebted for much of the information contained in this article.

THE NEW BRIDGE.

The masonry of the piers is being extended on the upstream side, to meet the requirements of the enlarged superstructure, but this addition is only above the water table of the cutwaters of the piers, as the present foundations are ample for the new work. The extension varies from 21 to 25 ft. On the downstream side the piers are being extended upward in line with the old masonry so as to give the additional width required for the new bridge. The masonry is of limestone ashlar, & the contractor for the extension of the piers is Wm. Gibson, M.P., of Beamsville, Ont., who has done a great deal of bridge & culvert work for the G.T.R., as well as the approaches to the Sarnia tunnel. A part of the walls and portals of the abutments of the bridge had to be taken down, & the upper portions of the piers (at their south ends) are also being taken down to such an extent as to admit of lengthening the piers as above described. Examination of the masonry showed that the material removed would be unsuitable for use for the external masonry, & it was thought it might be employed for the backing, but when it was removed it was found to be quite unsuitable, as it crumbled under slight pressure. Each course of the new masonry is to be of the same depth as the course of the old masonry of which it becomes an extension, & all the masonry will be built of dimension stone, all faces being pick or hammer dressed. The vertical joints in each course must overlap those in the course below by at least 12 ins. The backing will be of squared or dimension stone, of the same thickness as the face stones. Following is an abstract from the specifications for the masonry work :

The face of the stones forming the ice breakers shall have a 2-in. margin draft all round, & shall be dressed off between to a uniform surface with a point or pick. All these face stones are to be clamped together, both vertically & horizontally, with iron. The horizontal clamps to be 2½ ins. wide, ½-in. thick, 24 ins. long ; these are to be turned down 2½ ins. at each end, & embedded their whole length and thickness in the stone. The vertical bolts are all to be 1 in. diameter, & to pass through the horizontal clamps & the vertical joints of the stones, to be let into the course below at least 9 ins. and to be secured thereto by fox-tail wedging.

Coping stones of piers & bridge-seats of abutments shall not be less than 5 ft. in length, nor less than 30 ins. in width. The top & face of each stone to have a 2-in. tooled margin draft, & to be neatly bush-hammered between. String courses & pedestals to be dressed in the same way as copings. The sides and ends shall be dressed so that vertical joints shall not exceed ¼-in. in width.

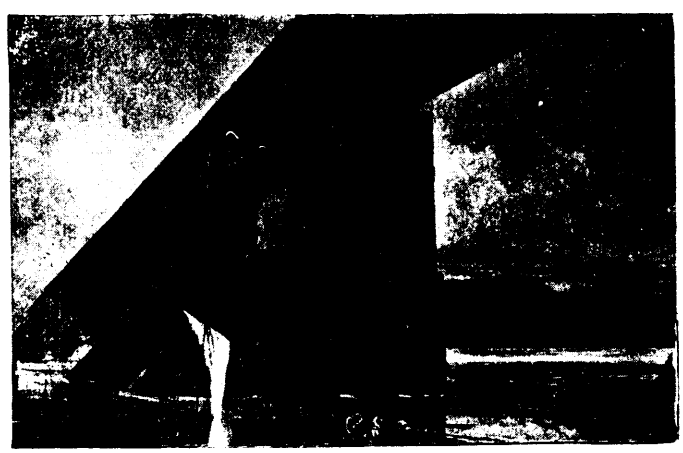


FIG. 2.—END SPANS, VICTORIA TUBULAR BRIDGE.

The ends will be fastened together, on top, by clamps 12 ins. long, 2 ins. wide & ¾-in. thick, let 3 ins. into each stone, two to a joint, & to be placed where directed, the whole of these stones to be set in full Portland cement mortar, made in the proportion of 1 part cement to 1 of sand.

Every stone of the masonry must be set in a full bed of mortar & beaten with a heavy wooden maul until a solid bearing has been secured, the vertical joints must be fully flushed and filled up, using for the purpose "swords" or rammers, & where necessary to insure perfect filling, grouting must be resorted to. Each course must be properly levelled throughout its whole extent.

The mortar must be composed of the best Portland cement, & clean, sharp, coarse & properly screened sand, thoroughly mixed in approved proportions ; these will be generally 2 parts of sand to 1 of cement, but they may be varied at the option of the engineer, according to the quality of the material. The cement & sand must be well mixed in a dry state ; then enough water must be added to make mortar of a consistency that can be properly handled by a trowel. Mortar must be made in small quantities & only as required. Re-tempering of mortar that has partly set will not be permitted.

The face joints of the masonry must be raked out to a depth of 1 1-2 ins. & pointed with pure cement mortar.

Mr. Gibson is allowed the use of the company's rails on the top of the bridge covering, on which a repair car had formerly been run, & as a consequence the work is being carried on in a manner astonishing in its simplicity.

The stone is reduced to its proper dimensions at Mr. Gibson's quarry at Crookston, near Madoc, Hastings County, & is transported on flat cars to the Point St. Charles end of the bridge, where a powerful steam derrick picks it up block by block & places it upon the car on top of the bridge covering. The car is moved by steam power to a point directly over the pier upon which the masons are at work. Here a travelling derrick takes the stone from the car & lowers it over the side of the bridge to the position that it is destined to occupy in the masonry, & its adjustment follows. One unacquainted with the method that has been adopted might picture to himself a huge pile of false work & scaffolding or a flotilla of barges as the necessary accessories of an undertaking so great. To the visitor the absence of anything of the kind is as much of a surprise as the simplicity of the plan that has been adopted. The bridge is supported by 24 piers & 2 abutments. The piers vary in height from 30 feet at the ends of the bridge to 60 feet on either side of the central span, the increased altitude being necessary to allow of the passage of vessels up & down the river.

THE SUPERSTRUCTURE

will consist of 24 spans of pin-connected,

through steel trusses, each 254 ft. long, c. to c. of end pins, & one of 348 ft. over the steamboat channel. The trusses will carry two railway tracks to be used by ordinary steam railway trains, as well as by electric railway cars, & the floor beam system will be extended beyond the trusses sufficiently to carry a 10 ft. roadway & a 5½ ft. sidewalk on either side.

The details of one of the 254 ft. spans are shown in fig. 4. It has parallel chords & inclined end posts, & is divided into two panels of 25 ft. 4¾ ins. c. to c. of pins, the depth of truss is 40 ft., c. to c. of pins, & the width between trusses is 31 ft. 2 ins. c. to c. The top chord is of trough section, 28 ins. deep, having four web plates, a top cover plate & eight flange angles. The pins in this chord are 6, 7 & 7 1-2 ins. diameter. The posts are of I-beams & built-up sections, & the diagonals are eye-bars, with turnbuckles on the counters in the two middle panels. The bottom chord is composed of 8 in. eye-bars, with 7 1-2 in. pins, the thickness & number of bars varying with each panel. The end pins are

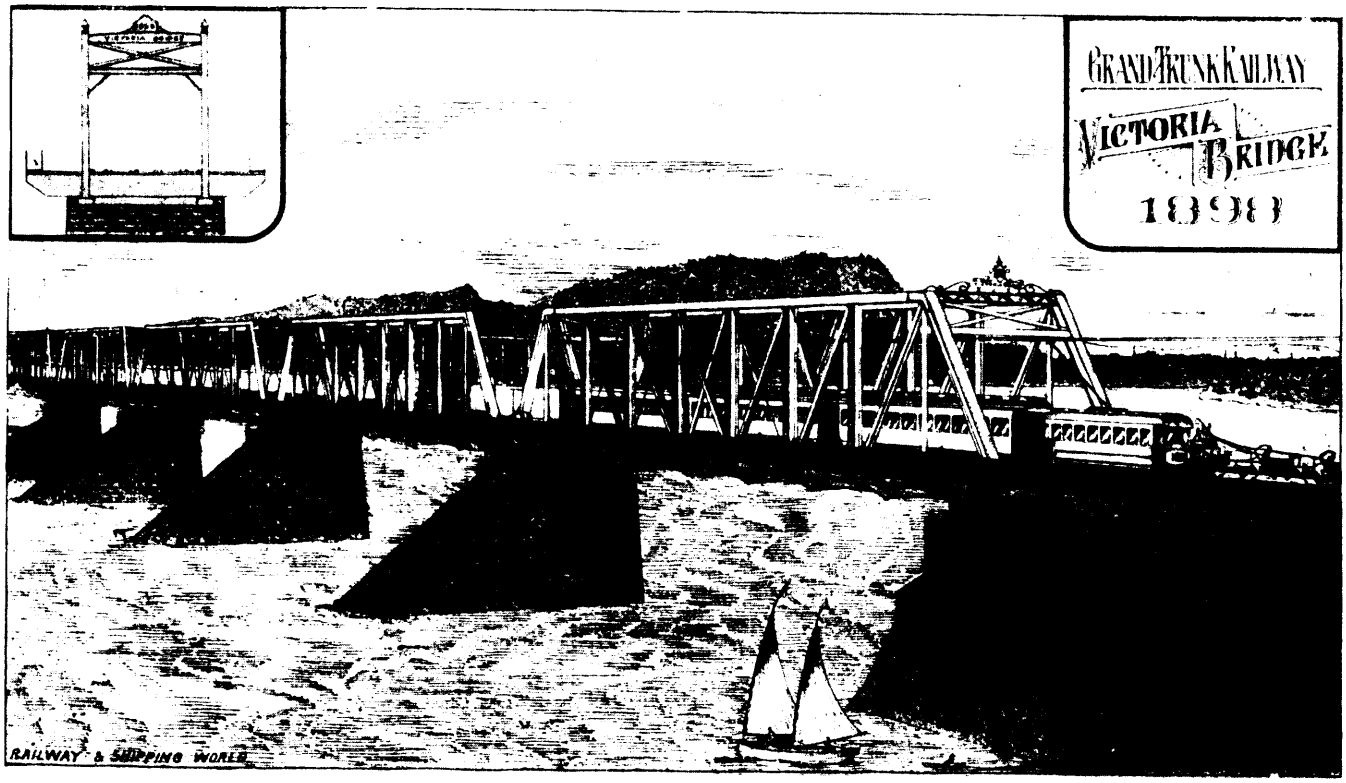


FIG 3.—ABUTMENT AND END SPANS, VICTORIA JUBILEE BRIDGE.

8 1-12 ins. diameter. The floor beams are plate girders 66 ft. 3 ins. long, suspended from the pins by I-beam hangers, the girders extending beyond the trusses to carry the roadways & sidewalks. The girders are connected by longitudinal & diagonal bracing. The trusses will be connected by transverse struts between the top chords, & between the posts, the latter struts being 15 ft. 1 in. below the top chords, giving a clear headway of 23 ft. 1 1-2 ins. from base of rail to the lower struts of the overhead lateral bracing. There will also be the usual horizontal & vertical lateral bracing, as shown in the plan & cross section, fig. 3.

Upon the central portion of these floor beams are carried 8 lines of stringers of 24 in. I-beams, 4 under each track, 2 ft. 5 1-2 ins. c. to c., the inner lines being connected by vertical diagonal bracing. Across these beams are laid pitch pine ties, 10 x 10 ins., 4 in. apart in the clear, these ties being long enough to carry both tracks. There will be two tracks of standard gauge, 13 ft. c. to c., with a guard timber outside each rail. On each cantilever end of the floor beams will be two lines of 20 in. I-beams for the roadway, & a 15 in. channel on the end of the beam. These carry the roadway timbers, which will be similar to the track ties, but 12 ins. apart. Upon these timbers will be laid a flooring of 4 in. plank for the roadway & sidewalk.

Across each end of each masonry pier (parallel with the bridge) will be laid seven 24 in. I-beams (100 lbs. per foot), 19 ft. long, the ends of which will be riveted to the end floor beams. On each set of I-beams will be 2 wall plates 4 × 5 ft., 1 1-2 ins. thick, upon which will rest the shoes of the trusses. The shoes at the expansion end will have nine rockers, 4 ft. 3 in. long, 3¾ ins. wide, & 7 ins. high, the top & bottom having curved faces. A variation in temperature to the extent of 150° is provided for in the expansion bearings. Between the floor beams, carried by the I-beams on the piers, are 15 in. I-beams which support the floor system across the pier.

The channel span of 348 ft. will have curved top chords to the main trusses, but the plans of this span have not yet been finally adopted.

The railway tracks will be used not only for ordinary trains. but also for electric cars, thus affording a more frequent service between Montreal & several small towns on the south shore. These cars will be run between the times of the regular trains, & interlocking switch & signal plants will be installed at each end of the bridge at the junction of the electric railway with the bridge tracks.

The trusses are designed for the following loads :

1. The total weight of metal in them, amounting to 5,910 lbs. per lin. ft. of span.

2. The weight of the wooden floor beams, planking, sidewalks, guard timbers, railings, rails & fastenings, etc., amounting, in the aggregate, to 2,800 lbs. per lin. ft. This, with the weight of metal, gives the assumed dead load of 8,710 lbs. per lin. ft. of span.

3. A moving load in either direction on each of the two tracks, consisting of two consolidation engines & tenders coupled, each weighing 284,000 lbs. on a length of roadway of 54 ft., followed by a uniformly distributed train load weighing 4,000 lbs. per lin. ft. The distribution of the engine loads is shown in one of the accompanying illustrations.

4. A moving load in either direction on each of the roadways of 1,100 lbs. per lin. ft.

5. A live load on each footwalk of 200 lbs. per lin. ft.

To provide for wind strains and vibrations in the 254 ft. spans, the bottom lateral bracing is proportioned to resist a lateral force of 450 lbs. per lin. ft. of span, 300 lbs. of this being considered as a moving load & as acting on a train of cars at a line 8 ft. 6 ins. above the base of the rail. The top lateral bracing is proportioned to resist a lateral force of 150 lbs. per lin. ft. of span. For wind strains in the 348 ft. span, 35 lbs. are added in each of the above cases.

Following are some extracts from the specifications :

Bed plates (on masonry) for the trusses are to be made of cast-steel. These castings shall be free from blow-holes, true to pattern & of a workmanlike finish. When tested in specimens not more than 2 ins. long, & of at least 1-2 in. uniform sectional area, it must give the undermentioned results :

Ultimate strength	67,000 lbs.
Elastic limit	34,000 "
Elongation in 2 ins	20%

All steel must be made by the open-hearth process, & shall contain not more than 0.08% of phosphorus in acid steel, or 0.04% in basic steel, & each kind must be of uniform quality.

All tests for tensile strength, limit of elasticity & ductility shall be made on samples cut from the finished material after rolling, & shall be at least 12 ins. long, & shall have a uniform sectional area of not less than ½-sq. in. All broken samples must show a silky fracture of uniform color.

When material is to be annealed or otherwise treated before use, the specimen representing such material is to be similarly treated before testing.

Soft steel shall have an ultimate strength of 54,000 to 62,000 lbs. per sq. in., with an elastic limit not less than half the ultimate strength & a minimum elongation of 25% in 8 ins. This steel must bend double, when cold, to close contact without sign of fracture on the outside.

Rivet steel shall have an ultimate strength of 50,000 to 58,000 lbs. per sq. in. & an elongation of 25%, & shall stand the bending test above specified.

Medium steel shall have an ultimate strength, when tested in samples of the dimensions given above, of 60,000 to 68,000 lbs. per sq. in., an elastic limit of not less than half the ultimate strength, & a minimum elongation of 22% in 8 ins.

This steel must stand bending 180° to a curve whose inner radius is 1 1-2 times the thickness of the sample, without cracking on the convex side, either when cold, hot, or after being heated to a cherry red & cooled in water of 60° F.

Eye-bars of 8 sq. ins. of area or less must elongate 15% in a gauged length of 20 ft.; must show a minimum elastic limit of 30,000 lbs. per sq. in., & develop a minimum ultimate strength of 58,000 lbs. per sq. in. For eye-bars of greater area, not exceeding 20 sq. ins. in section nor 2 ins. in thickness of bar, a reduction will be allowed to a minimum requirement of 56,000 lbs. ultimate strength, 29,000 lbs. elastic limit, & an elongation of 10% in a gauged length of 10 ft.

Eye-bars tested to destruction & fulfilling the above conditions shall be accepted even though they break in the head, if not over one-third of the bars tested break in this manner.

Pins made of either soft or medium steel shall, on specimen test pieces cut from finished material, fulfil all the requirements of the grade of steel from which they are rolled, excepting the elongation, which shall be decreased 5% from that specified.

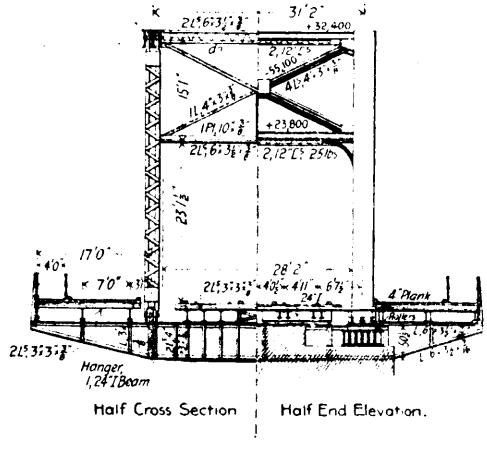
Pins up to 6 ins. diameter shall be rolled. Pins exceeding 6 ins. in diameter shall be forged under a steam hammer striking a blow of at least 5 tons. The blooms to be used for this purpose shall have at least three times the sectional area of the finished pins.

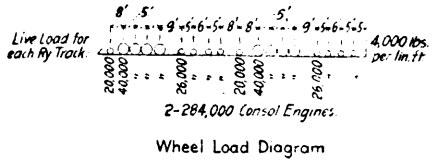
After pins have been manufactured to diameter, they shall be carefully & uniformly heated to a medium orange color in a closed furnace, & not in contact with the fuel, after which they shall be buried in warm, dry sand or ashes until cool.

All pins more than 5 ins. diameter shall be bored through the center.

Punched rivet holes, pitched two diameters rom a sheared edge, must stand drifting until the diameter is one-half larger than the original hole, without cracking the metal.

All holes for field rivets, excepting those in connections for lateral & sway bracing, shall be accurately drilled to an iron templet, or





reamed while the connecting parts are temporarily put together.

The several parts composing a riveted member shall be so accurately punched & reamed, that upon being assembled, connecting holes shall be truly opposite. If they are not they may, if the inaccuracy does not exceed 1-16 in., be still further reamed to bring them exactly into line.

The heads of eye-bars & enlarged ends of rods shall be made by upsetting or forging into shape. Welds in the body of the bar will not be allowed, except to form loops of laterals, counters, sway rods or unimportant details.

The eye-bars shall be annealed, & must be perfectly straight before boring, & must be free from all flaws or defects & of full thickness in the necks. Welds in the body of these bars will not be allowed. The heads of these bars must be so proportioned & made that when tested to destruction, the bars shall break in the body of the original bar rather than at any part of the head or neck, & shall be made by upsetting, rolling or forging into shape.

Bars which are to be placed side by side in the structure shall be bored at the same temperature & of such equal lengths that on being piled on each other the pins shall pass through the holes at both ends without driving.

The pins shall be turned accurately to gauge & shall be straight or smooth; chord pins up to 4½ ins. diameter shall fit the pin holes within 1-50 in.; for pins of a larger diameter the clearance may gradually be increased to 1-32 in. for pins of 6 ins. diameter & over. Lateral pins shall fit the pin holes within 1-32 in.

The open sides of all compression members shall be stayed by batten plates at the ends, & diagonal lattice work at intermediate points. The batten plates must be placed as near the ends as possible, & shall in length be not less than the greatest width of the member, or 1½ times its least width. The size & spacing of the lattice bars shall be proportioned to the size of the member.

The trusses shall be given a camber, by making the panel lengths of the top chord longer than those of the bottom, in the proportion of ⅛ in. to every 10 ft.

The shop painting will include 1 coat of paint to all inaccessible parts, & 2 coats after erection, all other parts being given 1 coat of raw linseed oil. Pin holes & planed surfaces will be coated with white lead and tallow. In the field the structure will be given 2 coats of paint. All paint will consist of 12 lbs. pure red lead, & 10 oz. lampblack per gallon of paint, thoroughly mixed with raw linseed oil.

The carrying capacity of the reconstructed bridge will be 11,000 lbs. per running ft., as against the present capacity of 2,240 lbs. per running ft.

Six of the trusses are being manufactured by the Dominion Bridge Co. at Lachine, Que., 10 by the Detroit Bridge & Iron Works, Detroit, Mich., & 9 by the Union Bridge Co., New York City. The whole 25 spans will be erected by the Detroit Bridge & Iron Works.

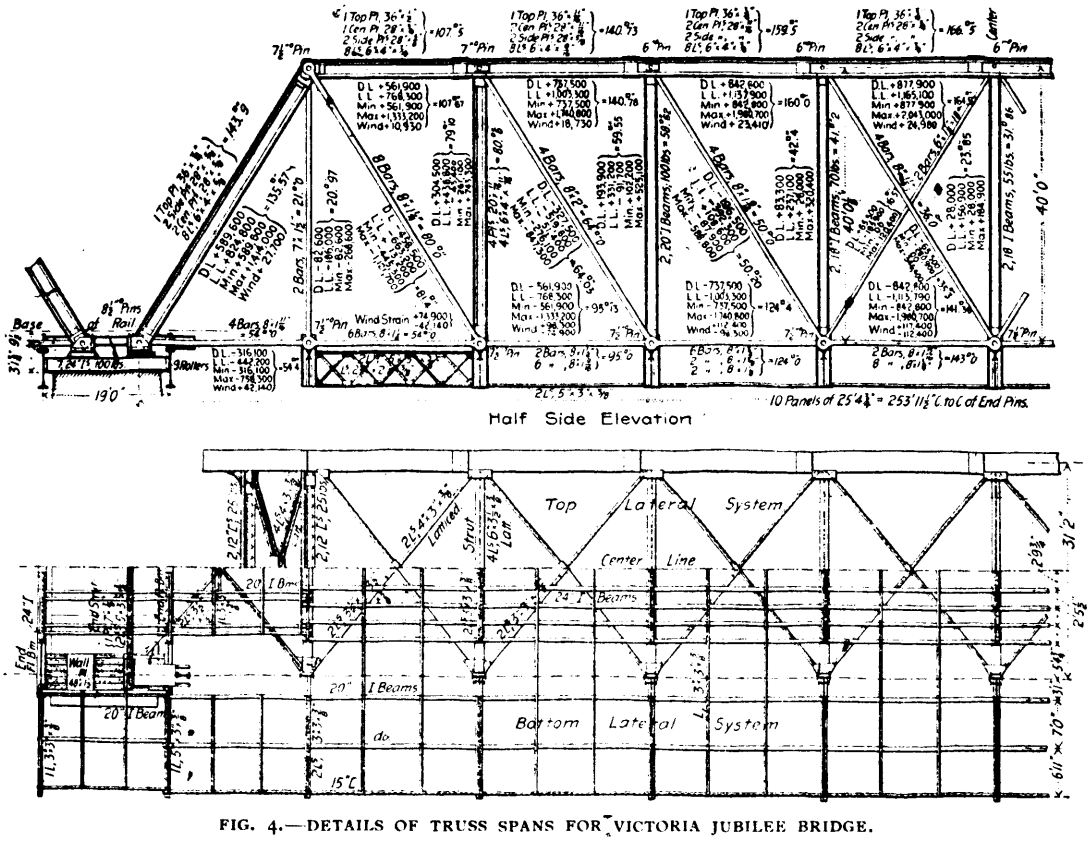


FIG. 4.—DETAILS OF TRUSS SPANS FOR VICTORIA JUBILEE BRIDGE.

The Chief Engineer, in response to our enquiry as to when the work will be completed, says he is unable to answer with any degree of certainty, but he hopes it will be finished this year.

C.P.R ANNUAL REPORT.

A Gratifying & Interesting Statement.

The 17th annual report of the directors for the year ended Dec. 31, 1897, was issued Feb. 26, over the signature of the President, Sir Wm. C. Van Horne, & reads as follows :

A balance sheet of the affairs of the Co. at Dec. 31, 1897, together with the usual statements and schedules are herewith submitted.

The gross earnings for the year were		$24,049,534.65
The working expenses were		13,745,758.76
And the net earnings were		$10,303,775.89
Add interest earned on deposits and loans	$ 74,001.48	
Add interest due from Duluth, South Shore & Atlantic Ry. Co. on consolidated bonds held by your Co. against debenture stock issued	$601,390.00	
Less advanced by your Co.	442,065.00	
	159,325.00	
Add interest from Minneapolis, St. Paul & Sault Ste. Marie Ry. Co. on bonds held by your Co. against debenture stock issued	107,380.00	
		340,706.48
		$10,644,482.37
Deduct Fixed Charges accrued during the year, including interest on land bonds		6,783,367.26
The surplus for the year was		$3,861,115.11
From this there has been charged off the ½ yearly dividend on preference stock ; 2 % paid Oct. 1, 1897	$167,413.33	
And ½ yearly dividend on ordinary stock ; 1½ % paid Oct. 1, 1897	975,000.00	
		1,142,413.33
Leaving balance		$2,718,701.78
From this there has been declared a ½ yearly dividend on preference stock of 2 % payable April 1, 1898	$196,613.33	
And a dividend on common stock for the last ½ year of 2½ %, payable April 1, 1898	$1,625,000.00	

The working expenses for the year amounted to 57.16 % of the gross earnings, & the net earnings to 42.84%, as compared with 60.80 & 39.20% respectively in 1896. The earnings per passenger per mile were 1.82c. & per ton of freight per mile 0.78c., as against 1.83, & 0.75c. respectively in 1896. Following is a statement of the results of working by months :

Month.	Earnings.	Expenses.	Net Earnings.
Jan	1,312,924.03	939,580.93	373,343.10
Feb	1,272,094.42	887,271.34	384,823.08
Mar	1,528,944.01	1,008,731.77	520,212.84
April	1,617,859.14	990,741.80	627,117.34
May	1,980,295.12	1,104,725.28	875,569.84
June	2,000,576.58	1,114,449.28	886,127.30
July	2,107,002.22	1,192,643.35	914,358.87
Aug	2,232,114.98	1,227,707.87	1,004,407.11
Sept	2,344,529.07	1,284,638.03	1,059,891.04
Oct	2,790,001.37	1,375,263.09	1,414,738.28
Nov	2,540,450.61	1,350,718.01	1,189,732.60
Dec	2,322,742.44	1,269,287.95	1,053,454.49

Notwithstanding the unfavorable results of the 1st 3 months of the year the directors are able to report a substantial increase in the earnings & profits of the Co. The improvement in the traffic of the Co. is due in large measure to the mining development in British Columbia ; the mining development in the Lake of the Woods district also contributed in no small degree. The discovery of extraordinary deposits of gold in the Canadian Yukon Territory has contributed appreciably to the general improvement, & is likely to contribute vastly more in the immediate future, for the movement in that direction can hardly be said to have commenced until within the past few weeks.

Under the authority given by the shareholders at the last meeting, the directors entered into an arrangement with the Dominion Government providing for the immediate construction of a railway from Lethbridge, Alberta, through the Crow's Nest Pass to a connection with your line at Nelson, B.C., 340 miles. This line has been completed to within 12 miles of the Crow's Nest Pass, at the summit of the Rocky Mountains, & the work beyond is well advanced. It is expected it will be completed to Kootenay Lake before the end of August. On reaching Kootenay Lake a temporary connection will be made with Nelson by means of a train ferry, whereby a through train service may be established, pending the completion of the railway along the shore of the lake to that point 60 miles distant. The Dominion Government has entered into an agreement with the Co. to assist the undertaking to the extent of $11,000 a mile, & the balance required will form part of your capital expenditure. This agreement will be submittted for your confirmation. It is worthy of remark that the maximum gradients on the Crow's Nest line through the Rocky and Selkirk ranges of mountains are only 1 ft. in 100 (with compensation for curvature), or barely ½ the maximum of any other railway crossing either of these ranges. This much-needed Canadian outlet for the Kootenay mining district, afforded by the Crow's Nest Ry., will give a decided impetus to mining and smelting, & is certain to add largely to the earnings of the Co.; but that the fullest advantage may be derived from it, & that the interests of your Co. may be protected in Southern B.C., it is necessary to move on westward from the Columbia River at Robson, the western end of your line, so as to reach the Boundary Creek District—about 100 miles—during the present year, & your authority in this regard will be asked. The opening of mines in the Boundary Creek district has been retarded by the lack of transportation facilities, but the mineral deposits have been proven to an extent sufficient to justify the belief that this is the richest district yet discovered in the Province. As a preliminary step towards the construction of the Crow's Nest line, the shareholders at their meeting on May 10, 1893, authorized the purchase of the section of the Alberta Railway between Dunmore, on your main line, & Lethbridge –109 miles—for $976,590. This purchase was consummated early in January last. The section of the Crow's Nest line west of the summit of the Rocky Mountains is being constructed under the charter of the B.C. Southern Railway Co., the acquisition of which, for an almost nominal consideration, you will be asked to approve. The work is being carried on by the officers of your Co. & on its completion the railway will become the property of your Co. at the actual cost of construction. Through the B.C. Southern Ry. your Co. acquires about 3,350,000 acres of land granted to that Co. by the Province of B.C., & also acquires 6 square miles of valuable coal lands near the Crow's Nest Pass—an amount of coal lands quite sufficient for the protection of the public as well as the Co., if need be, against unduly high prices. The lands first mentioned are all adjacent to the railway as it is laid out between the Crow's Nest Pass & Kootenay Lake. They have not as yet been examined in detail, but will no doubt prove a valuable asset. The lands are not taxable until leased or alienated. The coal deposits made accessible by the Crow's Nest Ry. are of great extent and extraordinary character. The aggregate thickness of the beds in the immediate vicinity of the railway exceeds 125 ft., and the coals are of excellent quality and make superior coke, the latter being of especial consequence as affecting the smelting of ores ; & in this connection it is worthy of remark that the mining districts of southern B.C. are exceptionally fortunate in possessing an abundance of coal, a boundless supply of timber, numerous waterpowers, a healthy climate, &, close at hand, agricultural districts, affording cheap and plentiful food.

Arrangements have been completed, subject to the approval of the Dominion Parliament, whereby your Co. may acquire the Columbia & Western Ry., extending from Robson to Rossland, 33 miles, for $800,000. With this property will be acquired the smelting works at Trail Creek, & about 270,000 acres of land in the vicinity, these being included in the purchase price named. Rossland having become the principal mining centre in B.C., it was necessary either to build an independent line to that place or acquire the Columbia & Western Ry., & the latter was clearly the wiser course. Your authority for the acquisition of this property will be asked, & you will be asked to approve the construction of a line 32 miles in length, connecting the Columbia & Kootenay Ry. with Slocan Lake, which was demanded by the Slocan mining district & which your directors felt obliged to carry out last year, anticipating your authority.

You will be asked to approve a lease of the St. Stephen & Milltown Ry. 4⅞ miles in length at a rental of $2,050 a year. This line affords access to a number of saw mills & manufactories in the vicinity of St. Stephen, N.B.

The Montreal & Ottawa Ry. is now practically completed to the city limits of Ottawa, & is expected to be in readiness for traffic at the beginning of the coming summer.

The results of the purchase of the Columbia & Kootenay steamers, as authorized by the shareholders a year ago, have been most gratifying. Additions have already been made to this fleet & more boats are required.

The directors have anticipated your authority in purchasing 2 ocean steamships for the new trade of the Canadian Yukon (Klondike) district. These steamships are intended to ply from Vancouver & Victoria, & are far superior to any now engaged in the trade, & should secure to your Co. a large share of it. Your directors have also caused to be put under contract 11 steamboats, costing approximately $350,000, for the lakes & rivers in the Southern B.C. mining districts, & for river service in the Canadian Yukon trade.

Your railway has been maintained in excellent condition & has enjoyed its usual immunity from serious accident. Two hundred & forty-seven miles of the principal lines of the Company were relaid with heavy rails (70 & 80 lbs. a yard) during the year. The sudden increase of traffic, subsequent to the last annual meeting, made necessary considerable expenditures on capital account for rolling stock, grain elevators & for terminal & station facilities, mining spurs, sidings & spurs for new industries, &c., which were not anticipated at that time, & the directors will ask your approval of these expenditures. They will also ask you to authorize them to make liberal provision for rolling stock, improvements of roadway, additional repair shops & various other matters, in order that your railway may be well prepared for the large traffic ahead, which now seems assured.

The rapid increase of traffic on the line between Montreal & Toronto makes it necessary to take steps towards the double tracking of that section of the Co.'s line, the traffic having now practically reached the limit of the capacity of a single track line. Your authority to proceed with this work as it may be conveniently & economically done will be asked.

Two hundred & fifteen timber bridges aggregating 5.7 miles were replaced with permanent work—masonry, steel or embankments—during the year.

A grain elevator of 1,000,000 bus. capacity was erected at Owen Sound & another, built of steel, & having a capacity of 1,500,000 bus., at Fort William.

Since the close of the year your Co.'s shares in the Pacific Postal Telegraph-Cable Co. have been sold for an equal amount in the bonds of the Commercial Cable Co., & your directors propose, with your approval, to expend a considerable part of the proceeds of this sale in

the extension & perfection of the Co.'s telegraph system in Canada—extensions & improvements which will add to your already handsome profits from this source. In connection with this sale your interests have been secured by a contract for the interchange of business with the same telegraph system for 20 years.

Your Co. has acquired the individual holdings of shares in the Chateau Frontenac Co., amounting to $80,000, & now holds all of the stock representing this hotel at Quebec—a property which is not alone profitable in itself, but brings a large amount of passenger traffic to the railway.

The Co.'s telegraph, express, grain elevators, sleeping-cars & lake steamers all afforded increased net earnings, & these, with the profits from the Pacific Steamships, **exceeded the interest on the whole of the consolidated debenture stock of the Co.**

Your Co. had nothing to pay on its guaranty in respect of the Minneapolis, St. Paul & Sault Ste. Marie Ry., but the improved conditions in the Western States did not begin to be felt by the Duluth, South Shore & Atlantic Ry. until late in the year, & the deficit of that Co. was $442,065, as already stated.

During the year $151,000 of the 4% consolidated mortgage bonds of the Minneapolis, St. Paul & Sault Ste. Marie Ry., $131,000 of the 4% consolidated mortgage bonds of the Duluth, South Shore & Atlantic Ry., & $518,750 of the 5% first mortgage bonds of the Montreal & Ottawa Ry.—all guaranteed by your Co.—were purchased with the proceeds of £145,875 4% consolidated debenture stock, a considerable saving in interest being thereby effected.

During the year your directors contracted for the sale of one million pounds 4% preference stock to apply on capital expenditures already authorized, including a portion of the Crows Nest Ry. construction, & the portion of the proceeds received before the end of the year was so applied.

Arrangements permanently assuring the traffic interests of the Duluth, South Shore & Atlantic Ry. west of Duluth having been made, the amount advanced to that Co. for the acquisition of the Duluth & Winnipeg Ry. has been returned to your treasury.

The land sales for the year were 199,482 acres for $665,740, an increase over 1896 of 111,604 acres, or 127%, & an increase in the amount realized of $356,812, or 112%. The net amount realized from town sites was $100,267, as against a deficit of $7,860 in 1896.

The recovery in the prices of farm products, & especially of wheat, has given vigor to agricultural development in the Canadian Northwest, & the directors anticipate a much larger increase in the land sales of the new year. The fact that a great majority of the established farmers in that part of the country realized from their crops & cattle in 1897 more than their lands & improvements had cost them, must result in a new & large movement of settlers in that direction. The business of Canada seems to have returned to its normal condition & prosperity is the rule in nearly all sections of the country.

EARNINGS FOR THE YEAR 1897.

From Passengers	$ 5,796,115.12
" Freight	15,257,896.94
" Mails	603,210.49
" Express	530,749.65
" Parlor & Sleeping Cars..	361,777.38
" Telegraph, Grain Elevators & miscellaneous, including profit on Pacific Steamships..	1,499,785.07
	$24,049,534.65

WORKING EXPENSES FOR THE YEAR 1897.

Conducting Transportation....	$3,434,755.39
Maintenance of Ways & Structures	3,018,748.90
Motive Power	4,211,586.61
Maintenance of Cars	955,013.12
Parlor & Sleeping Car Expenses	78,673.90
Expense of Lake & River Steamers	333,381.68
General Expenses	1,336,022.47
Commercial Telegraph	377,576.69
	$13,745,758.76

EQUIPMENT AT DECEMBER 31, 1897.

Locomotives	598
First & 2nd class passenger cars, baggage cars, & colonist sleeping cars	588
First-class sleeping & dining cars	99
Parlor cars, official & paymasters' cars	30
Freight & cattle cars (all kinds)	15,544
Conductors' vans	312
Board, tool & auxiliary cars & steam shovels	575

Pacific Steamships—Empress of China, Empress of Japan, Empress of India.
Pacific Coast Steamships—Athenian, Tartar.
Lake Steamers—Alberta, Athabasca, Manitoba.
Ferry Steamers—Ontario, Michigan.
River Steamers—Kootenay District—Kootenay, Rossland, Lytton, Kokanee, Slocan, Illicilliweat, Aberdeen, Trail, Nelson, Columbia.

Index to the Railway Act.

An index to the Railway Act of Canada, & its various amending acts, has been issued by J. Leslie, of the Department of Justice, Ottawa, & R. R. Cromarty, Manager of the Canada Law Journal, Toronto. The index was prepared by W. Vaughan, barrister, who was for a number of years Secretary to Chief Solicitor Clarke, of the C.P.R., & will undoubtedly be found very useful not only to lawyers, but to every railway man who wants to consult the statutes relating to railways. It is published by the Canada Law Journal Co., Toronto. Price, $1.

THE CANADIAN PACIFIC RAILWAY COMPANY.

Dividends for the half-year ending December 31st, 1897, have been declared as follows:

On the Preference Stock, 2 per cent.
On the Common Stock, 2½ per cent.

Warrants for the common stock dividend will be mailed on or about April 1st to shareholders of record at the closing of the books in New York and London respectively.

The preference stock dividend will be paid on Friday, April 1st, 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, February 25th, and in Montreal and New York on Tuesday, March 8th. The preference stock books will close at 3 p.m. on Tuesday, March 8th.

All books will be re-opened on Thursday, 7th April.

By order of the Board.

CHARLES DRINKWATER,
Secretary.

Montreal, Feb. 14th, 1898.

CANADIAN PACIFIC RAILWAY CO'Y.

Notice to Shareholders.

The seventeenth Annual Meeting of the shareholders of this Company for the election of Directors and the transaction of business generally will be held on Wednesday the 6th day of April next, at the principal office of the Company at Montreal, at 12 o'clock noon.

The common stock transfer books will close in London at 3 p.m. on Friday, February 25th, and in Montreal and New York on Tuesday, March 8th. The preference stock books will close at 3 p.m. on Tuesday, March 8th.

All books will be re-opened on Thursday, April 7th.

By order of the Board.

CHARLES DRINKWATER,
Secretary.

Montreal, Feb. 14th, 1898.

The Hall Signals at Montreal.

The Canadian Pacific Railway has recently completed the installation of a system of automatic electric block signals between Windsor Street station, Montreal, & Montreal Junction, a distance of about 5 miles of double track road. The system was installed by the Hall Signal Company, of 44 Broad Street, New York City. The signals are of the disc type & are placed on wooden posts, located to the right of the track they govern, & consist of a home & distant signal on each post; home signal, red, governs first block; distant signal, green, governs second block; one above the other, with the exception of the last east-bound signal at Montreal, & the last west-bound signal at Montreal Junction, which are arranged for special movements of trains.

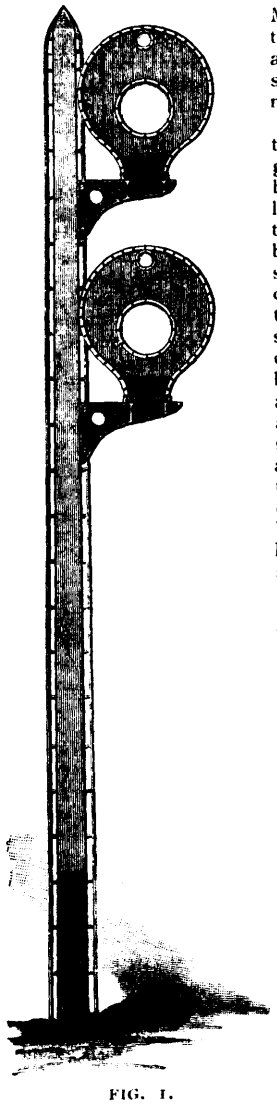


FIG. 1.

The home or top signal (red) governs the block immediately in advance of the signal. The bottom or caution signal (green) indicates the position of the next signal in advance, or of the second block ahead. If an engineer upon approaching a signal finds both at clear, he knows that the track is clear for two blocks ahead. If he finds the home signal at clear, & the caution signal displayed, he knows that the second block ahead is occupied & he must be prepared to stop before passing the next home signal. If he finds both the home & distant signal displayed, he will of course come to a stop before entering the block.

The road is divided into sections or blocks of about one mile each, the signals being located at the entrance to the block. They are operated by the rail circuit on what is called the "Normal Danger Plan." That is, all signals show danger or stop, except when a train is approaching, in which case they will show clear, providing the track they govern is clear of trains, & there are no open switches or broken rails, & if the apparatus is in complete working order. The signals are controlled directly by a track circuit, which consists of a battery placed at one end of the block, & an electrical instrument, or relay, at the other end of the block near the signal. Normally the current flows from one pole of the track battery to one rail of the track, along this rail to & through the relay located at the signal, & back to battery by means of the other rail, making a complete circuit holding the relay closed. The signals themselves are operated from a local battery, the circuit of which is controlled by the relay referred to above. Therefore, a signal can only be cleared when its relay is closed.

The ends of the rails are electrically separated from each other at the entrance to and the end of each block. Therefore, each track section has its own track circuit. When a train passes a signal, the current from the track battery which had been passing through the relay at the entrance of the block, is shunted through the wheels & axles of the train, causing the relay to open, breaking the signal circuit, causing the signal to go to the danger position by gravity.

The local circuit which operates the signals is conducted by means of weatherproof copper wire, strung on the telegraph poles by the side of the road in the usual manner. The batteries are all placed underground, away from the frost, and are of the gravity type for track circuits, & Gordon-Burnham type for signal circuits, each signal being provided with a separate battery.

In addition to the signals for the information of the engineers, there are small miniature signals or indicators placed at each switch, & so arranged that they will show danger (red) when a train on the main line approaches the distant signal which is connected with said switch. When it is necessary to open a switch leading to the main line, the switchman must first look at the indicator. If this shows clear, he knows that there is no train approaching, in which case he will open the switch, which will at once set to danger the home signal protecting the block in which the switch is located, and the distant signal in the next block back.

In the case of a cross-over, the opening of either switch would immediately block both tracks. At Windsor Street yard special arrangment has been provided in order to govern the entrance to the yard, as it is sometimes necessary to run trains a short distance against traffic.

Distant bells are also provided so that the switchman is informed when a train is approaching the yard, & indicators located in switch-house advise him the position of the signals.

This system of automatic block signals is believed to be the first application of this character that has been introduced into Canada, although the Hall Signal Company has installed a large number of them in the United States.

In response to an inquiry as to how the signals are working, Manager Tait, of the C.P.R. Eastern Lines, writes THE RAILWAY & SHIPPING WORLD: "We are having very satisfactory results with the Hall automatic electric block signals on our track between Montreal & Montreal Junction, as you will see from the enclosed working statement from Oct. 17, '97 to Feb. 17, '98: No of days in operation, 123; approximate no. of trains daily, 40; no. of signals, 14; approximate no. of operations, 68,880; no. of failures, 11; percentage of failures to operations, .000012."

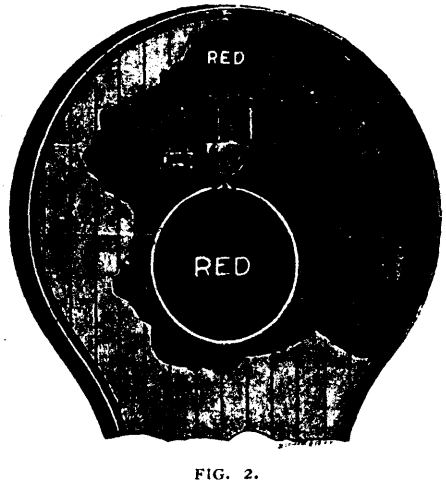


FIG. 2.

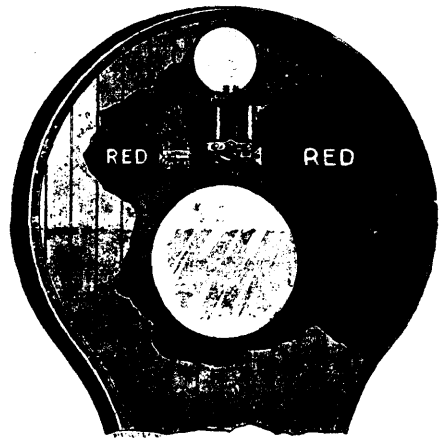


FIG. 3.

DETAILS OF FAILURES.

	No. of train or engine.	CAUSE.	Minutes Delay.	Signal no.
1897				
Oct. 29	101	Broken line wire	2	7
Nov. 19	101	Open switch spring at cross over	2	3
Dec. 2	2	" " "	2	4
" 2	E. 18	Locking gear of signal instrument failing to work	2	8
" 5	Spcl.	" " "	2	4
" 4	2	" " "	2	4
" 18	7	" " "	2	7
" 28	14	Open switch spring	2	8
1898				
Jan. 4	12	" "	2	13
" 25	623	" "	2	8
" 28	101	Locking gear of signal instrument failing to work	2	7

Delay of 2 minutes to each failure as per rules.

General Superintendent Leonard, of the Ontario & Quebec Division, writes: "These signals are giving the best of satisfaction, notwithstanding the very severe weather we have had, and I have no doubt they will prove eminently satisfactory."

The record above given is certainly a very good showing, in view of the unusually severe weather experienced in Montreal this winter. Among the causes of failure are a number of cases where the locking-gear failed to work in the signal instrument. It should be explained that any failure of this lock, or in fact any part of the apparatus, produces a danger signal, causing an unnecessary stop. The system does not display a safety signal when the apparatus is out of order. The locks have been readjusted & it is not expected any more trouble will be caused on that account, & that the next quarterly report will most likely be even better than the last.

In the accompanying illustrations fig. 1 shows the signals on post, the two discs on the top signal being colored red, & those in the bottom signal green. Figs. 2 & 3 give interior views of the signal case, fig. 2 showing "danger" position of signal (by gravity), & fig. 3 "safety" position of signal (by electro-magnetism).

Last September the despatching office for the Manitoba division of the Northern Pacific was removed from Winnipeg to Grand Forks, North Dakota. Superintendent Vanderslice now says the removal, which was thought to be only temporary, is likely to be permanent.

A Prince Albert, Sask., paper is authority for the statement that on a recent drifty night a horse & vehicle were carried nine miles on the cow-catcher of a locomotive on the C.P.R.'s Prince Albert branch. The horse had started home without its owner, & was picked up en route by the locomotive.

THE RAILWAY & SHIPPING WORLD.

AN ILLUSTRATED PERIODICAL DEVOTED TO STEAM & ELECTRIC RAILWAY, SHIPPING, EXPRESS, TELEGRAPH & TELEPHONE INTERESTS.

THE RAILWAY & SHIPPING WORLD CO., PUBLISHERS, 33 MELINDA STREET, TORONTO, CANADA.

SUBSCRIPTION PRICE, postage prepaid, to Canada & the United States, $1 a year ; to Great Britain & other countries in the Postal Union, $1.25 (5 shillings sterling). The best & safest way to remit is by express or post office money order payable at Toronto.

ADVERTISING RATES furnished on application to the publishers.

TORONTO, CANADA, MARCH, 1898.

PUBLISHERS' ANNOUNCEMENT.

THE RAILWAY & SHIPPING WORLD takes its place to-day in the field of periodicals for the purpose of representing the transportation interests of Canada—steam & electric railways and shipping—& the allied express, telegraph & telephone interests.

It is not entering into competition with any existing publication, as while the field of what is known as trade journalism is well filled in regard to almost every other industry & interest, there is no other publication in Canada devoted to the transportation interests.

Hitherto the officials of Canadian transportation companies have had to depend on foreign publications for their "trade" reading, & careful enquiry among them shows that only a small minority get any periodical devoted to their business. Necessarily the space devoted by foreign publications to Canadian matters is limited, & of secondary importance. THE RAILWAY AND SHIPPING WORLD will endeavor to give a full & accurate record of everything transpiring in Canada relating to the interests enumerated above, supplemented by technical & other articles of interest & value to the class of readers to which it addresses itself. Its publishers believe in performances rather than promises, & will content themselves with saying that no effort will be spared to make the publication a thoroughly up to date one, editorially, typographically, & in every other respect. Illustrations will be freely used whenever they can be made to serve a practical purpose.

In political affairs, as such, THE RAILWAY AND SHIPPING WORLD has no interest, & is absolutely independent of either party, but this does not imply neutrality, & it will not hesitate to freely criticise whenever public nterests so demand.

It is also absolutely independent of any railway or other corporation, & while being entirely impartial in giving the facts in regard to the operations of all these corporations, it will never forget that it is a Canadian publication first, last & all the time, & that it is its duty to do everything possible to assist in the development of transportation as far as possible within Canadian territory & to Canadian ports.

The St. Clair Tunnel Co. is contemplating converting the motive power for the tunnel from steam to electricity. Ever since the casualty of Nov. 28, the officers of the Co. have given the subject of electrical propulsion considerable attention, & it is reported they have now about decided to equip the tunnel with electrical power.

TO ADVERTISERS.

For the past six months diligent work has been done in building up a subscription list, so that while a new periodical, THE RAILWAY & SHIPPING WORLD has to-day a circulation that it would have taken considerable time to secure, had nothing been done in advance of publication.

Its publishers make the statement, & guarantee its reliability as a basis of all advertising contracts, that THE RAILWAY & SHIPPING WORLD reaches :

Every official of every steam railway in Canada, in the executive, purchasing, operating, transportation, mechanical, freight, passenger, engineering, financial, accounting & legal departments.

Every official of every electric railway in Canada.

Every manager of a steamboat line in Canada, & every manager or owner of every steamboat carrying passengers & freight for hire in Canadian waters.

Every official of every express, telegraph & telephone company in Canada.

Hitherto manufacturers & other advertisers have been unable to reach the above mentioned purchasers by using any one publication. It does not pay Canadian advertisers to use United States transportation periodicals, as no single one of them has a general circulation throughout Canada, the comparatively limited number of their subscribers in Canada being divided up among a score or more of them. On the other hand United States advertisers wishing to reach Canadian purchasers are unable to do so through any single publication on their side of the line, & even if they advertise in all the U. S. transportation papers, it must be borne in mind that these papers are taken by a very limited number in Canada.

THE RAILWAY & SHIPPING WORLD simply presents these facts for the consideration of advertisers, to whom its publishers will be happy to quote rates on application.

PRESSURE ON SPACE.

Instead of having a dearth of matter for publication, THE RAILWAY & SHIPPING WORLD finds itself in the position of having far more than can be accommodated within the limits which have been fixed on for the present. So much space has necessarily had to be devoted to the Canadian Yukon Railway, the Victoria Jubilee Bridge, the ocean & river navigation to the Yukon, & the C.P.R. annual report, that a considerable amount of matter relating to other railways has had to be held over, & it has been found impossible to give any space to the electric railway, express & telephone interests in this issue. These departments will be commenced in the next issue, & will form important & regular features of the publication.

The Council of the Quebec Board of Trade has adopted a resolution calling on the Dominion Government, in case it removes the western terminus of the Intercolonial R'y to Montreal, to give such aid as will ensure the construction of the Quebec bridge, & also to establish the workshops of the Intercolonial at Quebec.

The Minister of Railways and Canals.

Considering the magnitude of modern railway enterprise & the growing importance of transportation as a subject of pre-eminent interest to the public, there could scarcely be a more responsible position in any cabinet than that held by the minister of railways & canals. This is especially true of Canada, with her vast areas, destined to support an empire ; & as the country becomes more thickly populated, the solution of the problem of adequate transportation will tax the ablest minds. Naturally, the Dominion Minister of Railways & Canals, the Hon. A. G. Blair, presiding over one of the most important departments of public affairs, occupies a large place in the minds of all Canadians.

Of Scotch descent, the Hon. Andrew George Blair was born in Fredericton, N.B., March 7, 1844. He was educated at the Collegiate School of that place, & entering the profession of law, was called to the bar in 1866. In October of the same year he married Annie, eldest daughter of George Thompson, of the Educational Department, Fredericton.

For twelve years he practised his profession most successfully, gaining a reputation for ability & integrity. His political career began in 1878, when he was Liberal candidate in the County of York, N.B. He was victorious in this contest, but, on a petition being filed against his return, he resigned, again contested the constituency & was elected. His ability was quickly recognized in the House of Assembly, & in 1879 he was chosen leader of the Provincial Opposition, a little body consisting of only six members in a House of 41. By 1882 he had 17 followers, & in March, 1883, he defeated the Harrington Ministry & was called to form a cabinet. In the ministry he occupied the office of Attorney-General. The public verdict remained in his favor during the successive contests of 1886 & 1890 ; but in 1892 he was defeated for York & elected for Queen's, on the resignation of the member-elect, Mr. Hetherington. For 13 years he was Premier of New Brunswick ; & in 1896 resigned the premiership & his seat in the House of Assembly to enter a wider field. When promotion from the Provincial to the Federal arena called him to Ottawa, it was the unanimous opinion of his party that the right man had been called from New Brunswick. In July, 1896, he was sworn in as member of the Privy Council, and appointed Minister of Railways & Canals in the Cabinet of Sir Wilfrid Laurier. He was elected for a seat in the Commons on Aug. 25, 1896. Already his department has been called on to deal with two of the most important transportation questions that have arisen within the last decade, the opening of the Kootenay districts of B.C. by the construction of the Crow's Nest Pass Railway, & the connection of the Yukon gold fields by means of an all-Canadian route ; & the whole Dominion has watched with intense interest the Government's railway policy regarding the two western gold fields.

Mr. Price, Private Secretary to Generai Superintendent McGuigan, of the G.T.R., has been appointed chief clerk in the office of M. C. Sturtevant, Car Service Agent at Montreal.

Carlos Warfield, Private Secretary to F. A. Heinze, has, according to the Anaconda, Montana, Standard, been romancing about the price paid by the C.P.R. for the Columbia & Western Ry., claiming that Mr. Heinze got what he first asked, $1,250,000, & retained important holdings in the district. As a matter of fact the C.P.R. never entertained any idea of paying that figure. The purchase price for the railway from Robson to Rossland, 33 miles, for the smelting works at Trail Creek, & half the C. & W. Co.'s land grant, about 270,000 acres, was $800,000.

THE CROW'S NEST.

Progress on the C.P.R. Line to the Kootenay.

The line is now located from the eastern terminus at Lethbridge, Alberta, to the crossing of the Kootenay River at the upper end of Kootenay Lake, a distance of, say, 287 miles, & preliminary surveys have been made to Nelson, B.C.

For the first 80 miles the line passes over what is called a prairie country, but very heavy grading is encountered, as well as the heaviest bridge work on the line. This is owing to the necessity of crossing St. Mary's River, Belly River, Pincher Creek & South Fork Old Man River, & the many coulees met with in order to reach these crossings. Following is a list of the principal structures on the 1st 80 miles:

Mileage.	Total Length.	Maximum Height.	Truss Spans.
3½	405 feet	110 feet	
7	420 "	105 "	
7.1	390 "	98 "	
7.8	450 "	85 "	
8.0	660 "	65 "	
8.3	490 "	130 "	1x150 D.H.T.
8.5	400 "	95 "	1x100 D.H.T.
8.8	400 "	90 "	
9	500 "	75 "	
9.6	200 "	90 "	1x150 D.H.T.
10	300 "	55 "	1x100 D.H.T.
10.3	400 "	35 "	
10.6 St. Mary's River	2750 "	65 "	2x150 D.H.T.
12.2	660 "	120 "	1x150 D.H.T.
14.4	450 "	75 "	
14.7	560 "	135 "	1x100 D.H.T.
15	300 "	50 "	
16	630 "	130 "	1x100 D.H.T.
26.5 Belly River	495 "	30 "	
58.3 Pincher Creek	710 "	110 "	1x150 D.H.T.
69	240 "	60 "	
67.1	375 "	70 "	
70 S. F'k Old Man Riv.	935 "	135 "	2x150 D.H.T.
79.3 M. " " "	190 "	20 "	1x150 T.H.T.

From mileage 80 to 105.8, where the line reaches the summit of the Rocky Mountains, the work is heavy, with a considerable amount of rock excavation. From the summit westward for 16 miles the work is also heavy, & involves the use of 2 tunnels & some 6 bridges from 60 to 200 ft. each in length.

The next 37 miles, following down the valley of the Elk River to the crossing of that stream, consists of earth & rock work with very heavy clearing & 2 bridges of 100 ft. span each. Elk River is crossed by 3 spans of 150 ft. each, & from there to the crossing of the East Kootenay River at Wardner, about 23½ miles, the earth work is heavy, & there are 3 bridges of, say, 80 ft. span each. It is proposed to cross the Kootenay River near Wardner by 3 spans of 150 ft. each, 1 span of 130 ft., & a swing span with a clear opening of 60 ft. From Wardner to Cranbrook, 23½ miles, the line passes through a park-like country, with the exception of about 5 miles through what is known as Isidores Canyon, where there is a considerable amount of rock excavation. From Cranbrook to the head of Moyie Lake, 12.7 miles, the earth work is moderately heavy. The line follows the east shore of Moyie Lake for about 8 miles, & the work is heavy, being almost entirely rock, with 1 tunnel of 500 ft. in length.

After crossing the Moyie River, 1 mile below the lake, the line follows the west side of the valley 21 miles, then turning to the westward & following up the valley of a small stream for 3 miles it reaches the summit between the Moyie & Goat River waters, in doing which the work is heavy. From this summit to the head of Kootenay Lake, 35 miles, the work is heavy, with a considerable amount of rock excavation & trestle bridging.

The maximum grade used in either direction is 1 ft. per 100 or 52.8 ft. per mile, & the sharpest curvature 12 degrees 478 ft. radius, but curves as sharp as this have only been used in a few places & compensation for same allowed.

The grading was commenced July 14 last, & has been completed from Lethbridge to the summit, & the bridging well advanced, track being laid on 63 miles. The grading westward from the summit is now being proceeded with rapidly, & the entire work is covered by contractors.

Station buildings & water tanks are being erected at average distances of about 18 miles. These vary in design according to the requirements of the locality. The track is being laid with 60 lbs. steel, though 72 lb. rails will be used on a large portion of the B.C. section.

A very large proportion of the line from the summit of the Rocky Mountains westward passes through a densely wooded country, on a portion of which fire has destroyed a large amount of what would now have been valuable timber, but there are still considerable tracts of land on or in the vicinity of the line where excellent fir, spruce, larch & cedar, can be procured. Valuable coal deposits are found close to the line in many places for 35 miles on either side of the summit, & rich veins of galena and silver are being opened up in the vicinity of Moyie Lake. The country passed through in Alberta is an excellent grazing one, & ranching on both large & small scales has been successfully carried on for a number of years. There are also considerable tracts where land suitable for mixed farming can be met with, especially in the vicinity of Pincher Creek & in the valleys of the Old Man & Belly Rivers & their tributaries, and these could be greatly increased by irrigation. West of the summit considerable tracts of land suitable for either grazing or farming are met with in the valleys of the Elk, Kootenay, Moyie & Goat Rivers ; & between the Elk & Moyie Rivers the country passed through, consisting of bench lands with glades of timber & occasional sloughs, is especially suitable for stock raising.

The Manager of Construction for the C.P.R. Co. is M. J. Haney, of Toronto, whose headquarters are at MacLeod. The Chief Engineer is Hugh D. Lumsden, C.E., of Toronto, by whom the foregoing particulars have been prepared. The following facts gleaned from other sources may be added :

The line has been ballasted as far as Pincher Creek, & is in splendid condition for traffic. West of the summit of the Rockies between 40 & 50 contractors, & between 3,000 and 4,000 men, are at work, & Mr. Haney expresses confidence that the line will be completed as far as the coal mines in May & to Kootenay Lake by October next. This will give the company a 60-mile stretch of deep water to Nelson, but the location of this last section of road is now being revised, & the work will be carried forward with as much energy as the eastern sections.

Two seams of coal are being opened, each about 6 feet thick, on the north & south sides of Coal Creek. By the time the railway reaches the mines, probably 8,000 or 10,000 tons of coal will have been mined & awaiting shipment. The capacity of the mines from then on will be from 500 to 1,000 tons a day.

A correspondent of the Calgary Herald who recently went over the route, contributes the following : From Goat River Landing, on Kootenay Lake, the present western terminus of the Crow's Nest branch, to Macleod, the eastern terminus, is one crowded panoramic scene of busy men, horses & machinery, engaged in pushing forward construction. At Macleod are situated the headquarters from where all operations are directed. At this point between 300 & 400 men are continually at work—in the offices, stores, yards, machine shops, saw mill, & constructing new buildings. At least one construction train a day leaves Macleod for the end of the steel. A siding is constructed here, where mountains of hay & foothills of oats, & great warehouses of provisions and clothing for the thousands of men & teams employed are stored until they are freighted to the different camps. By the assistance of powerful headlights, night shifts work on the bridges as well as day shifts, and the timbers are sent from the mill numbered & ready to be put into position, so that 125 men with the assistance of chutes, hoists & other modern machinery can handle 150,000 ft. of bridge timber every 24 hours.

The system of freighting is worthy of mention. To get the supplies into the various camps is a large undertaking, as from 3,000 to 4,000 men & the enormous number of horses consume an immense quantity of provisions. For freighting purposes the distance has been divided into 2 divisions, with Wardner as the centre point. The western division is supplied from headquarters on Goat River, & the eastern division from the Macleod headquarters. Porter Bros. have the contract for freighting from the west, & Strevel & Buchanan from the east. There are over 200 teams engaged in freighting & the demand is not supplied. This number will need to be doubled, as most of the supplies for the spring & summer must be freighted in before the road breaks up. To facilitate freighting operations the company has erected large warehouses at 40 mile distances from the end of the steel to Goat River Landing, which will be filled with supplies, & the different contractors can obtain what they want from these distributing points.

Several towns are springing up along the line, principal among which are the temporary western terminus where connection will be made with Nelson & West Kootenay by steam boat ; Moyie City, which is situated on Moyie Lake, & near which is the St. Eugene mine, & several other valuable & promising mining properties ; Cranbrook, the market for 25,000 acres of farming land & a C.P.R. divisional point ; Wardner, the present centre of activities, & Coal Creek, which is situated in the centre of the coal mining district.

There is great variety of climate in the 287 miles distance. At the western terminus & for about 12 miles east there was no snow & very little frost, but a good deal of wet weather. From the snow line east until the summit was reached there was snow enough for sleighing & the weather was calm & cold, but not severe. When the summit was left behind the atmosphere was noticed to be disturbed with a gradually increasing wind until Crow's Nest Lake was reached, when the wind became almost a hurricane. The mercury dropped as suddenly as the wind rose. This windy weather continued until Macleod was reached.

The route of the Crow's Nest Branch is shown on the C.P.R. map opposite the last page of this issue.

A telegram from Wardner, B.C., announced the arrival there on Feb. 23 of the commissioners appointed by the Dominion Government to enquire into the alleged grievances of men employed on the Crow's Nest Pass branch construction. The general grievances appeared to be cost of transportation from eastern points, owing to alleged misrepresentation of employment agents, insufficient medical attendance, & the low rate of wages. Not a single complaint was made by any of the men in Egan & Co.'s camps, & many of the grievances from other parts of the line were, on investigation, found to be groundless.

The Westinghouse Air Brake.

One of the most important manufacturing industries which has gone into operation during the past year in the Dominion, is that of the Westinghouse Manufacturing Co., Limited, which has established itself permanently in Hamilton, Ont. This company has the sole & absolute control of all the privileges connected with the manufacturing & sale of the Westinghouse Air Brake in Canada.

The fact that strenuous efforts are being made by both the governments of Canada & the United States to compel railway companies to apply proper safety appliances &

apparatus, such as have been demonstrated to be of sufficient usefulness & merit, in the protection of life & property, to all rolling stock, including locomotives, passenger cars, & freight cars, makes the fact of the Westinghouse works having been established here of great & special importance to the railway companies of the Dominion. From the fact of the Westinghouse Air Brake having become a recognized standard, not only of the American continent, but of the world, and that it has already been applied to more than 550,000 freight cars in Canada & the United States, in addition to all the passenger cars & the majority of the locomotives, it becomes almost imperative that the same system must be generally adopted in this country, as the successful operation & maintenance of an apparatus of this character can only be secured by having it absolutely uniform & interchangeable. It is an undoubted fact that the reason why the railways of the Dominion have been somewhat tardy in regard to the general adoption & application of air brakes to their rolling stock, has resulted from the other fact that the apparatus was not manufactured in Canada, & that to import it meant to them, on account of the customs duty on this class of material, an increase in cost over that paid by the railways in the United States of 30 per cent., or practically $12 a car. This obstacle has been entirely removed by the Westinghouse Co. establishing its works in Canada, & in addition to this, the Co. is furnishing employment to a large number of Canadian artisans.

The original Westinghouse Air Brake Co. was organized in Pennsylvania in 1869, & its early patents contained all the elements of novelty & real merit, of what is now known as a science, & which enabled it to secure the patents which then formed, & which are now, in some modified form, better adapted to present requirements, & contain all the elements that go to make up a satisfactory & efficient air brake apparatus.

The development of the air brake business has been most carefully pursued, & additions & improvements have been made from time to time, until it would almost appear as though the acme of perfection had now been arrived at, & that we have to-day, in the Westinghouse Air Brake, one of the best & most important mechanical safety devices of the age.

The air brake business is not by any means confined to America, but has extended to England, France & Germany, in each of which countries there have been established for some years large works for its production, the markets of China, Japan, Russia & South America, being supplied with the apparatus by the home company in Pittsburg, Pa.

Occasionally is seen here and there some paragraph emanating from persons badly informed upon the subject, that the Westinghouse Co. is more or less of a monopoly. Assertions of this kind, however, cannot be well sustained, from the fact that whenever the question to its title to the rights which it now enjoys has been presented before the courts in any matter of litigation, the Company has invariably been sustained; & in addition to this it might be well to note that, without in any way being coerced by competition, it has constantly, on account of its improved methods & special machinery, been enabled to reduce the price of the apparatus to about one-half of that which it originally cost the railroad companies. Every care is being exercised by the Company to maintain & care for the general efficiency of the apparatus, & it annually spends large sums of money for the instruction of trainmen in the proper care & manipulation of the brake apparatus, & by furnishing inspectors at its own expense, the services of whom are, at all times, at the disposal of any railway company, for such purposes as they may be required.

The more important business of the air brake companies at present is, & for some time in the future will be, the equipping of freight cars. Recent statistics show that some 550,000 cars have been equipped in Canada & the United States, which is probably about 35 or 40 per cent. of all the available cars at present in use in North America.

The increased weight of the modern locomotive & car has made it absolutely necessary that a power brake should be used to control them, & the fact of their being so controlled practically increases the capacity of the railways which have their rolling stock so equipped. It is well known that the old time schedule for freight trains was from 15 to 20 miles an hour, whereas, at the present day, it is not at all unusual to run heavy through freight trains on comparatively passenger schedule. This fact can only be attributed to the other fact, that these through trains are air-braked throughout, thus placing their control entirely in the hands of the engineer, & the entire handling of the train is similar in every respect to that of the ordinary passenger train equipped in the same way, with which most readers are quite familiar.

The capacity of the Hamilton works is quite equal to all the requirements of the railways in the Dominion, & they are kept actively engaged by the trunk lines, including the Grand Trunk, Intercolonial & Canadian Pacific, in the manufacture of freight brakes, & other apparatus of a similar character; it being the intention of these companies to have their entire rolling stock equipped as fast as possible.

The Hamilton Works, as a manufactory, is quite a model machine shop. The machinery,

which is most modern, & in the majority of cases of special design, is well arranged, & the buildings, which are well lighted, & cleanly in every respect, have been adapted in every particular to the requirements of the Company, not only with a view to facilitating its own interest, but also with due regard for the comfort & health of its employes. The works are situated in the eastern part of the city, & in close touch with the Grand Trunk, Canadian Pacific, & Michigan Central railways.

Efforts are being made to establish, in various parts of the Dominion, works for the manufacture of automatic couplers for freight trains. This is another safety appliance which has received the attention of the governments of the several countries as being of absolute necessity, more especially in the protection which they afford to men who handle cars in the capacity of brakemen. Several large companies are engaged in the manufacture of this material in the United States, & the product of each of these manufacturers has some special features which recommend them to the railway companies. Much time has been given to the subject of couplers by the master car builders of Canada & the United States, with a view to having the different makes of couplers sufficiently uniform in such particulars as to allow of more or less the necessary character of interchangeability; & certain rules have been established by these parties to which all couplers must conform, the most important of which is known as the vertical plane principle, & standards have been adopted which control the height of the coupler from the rail, & other detail connected with its application.

The recent act of the United States Congress in regard to the application of safety devices to all rolling stock, the limit of which would have expired in January, 1898, has been extended for two years; but there is little doubt that the railway corporations having become convinced of the importance of this subject, without any regard for the extension of time, will continue to use their best efforts to have their rolling stock equipped with these appliances at as early a date as their finances, & the facility for handling their cars for this purpose, will allow.

The Wabash in Canada.

Over a year ago arrangements were made between the Grand Trunk & Wabash Ry. Co.'s by which the latter used the former's tracks for passenger service between Windsor & Niagara Falls, by way of Glencoe Jct., Komoka, London, Woodstock, Paris, Hamilton & St. Catharines. Under a new arrangement which went into effect Mar. 1, the Wabash has secured facilities for a passenger & freight service from Windsor to Buffalo & Suspension Bridge, as explained in the following circular issued Feb. 23, signed by General Manager Hays, of the G.T., & Vice-President & General Manager Ramsey, of the Wabash:

"TO ALL OFFICERS, AGENTS & EMPLOYES OF SOUTHERN DIVISION: The G.T.R. having leased the Wabash Ry. Co. trackage rights over that portion of the G.T. extending from Windsor, Ont., to Black Rock Station (Buffalo), N.Y., via Glencoe Jct., St. Thomas, Welland Jct. & Ft. Erie, also from Welland Jct., via Allanburg Jct., to Suspension Bridge, N.Y., that line will hereafter be used jointly by the two companies, & will be designated as the SOUTHERN DIVISION. Effective Mar. 1, 1898. G. C. Jones is appointed Joint Superintendent of the Southern Division, with headquarters at St. Thomas, Ont. He will have the appointment of, & full control over, all subordinate officers, agents and employes of the Southern Division, & of the operation, maintenance & care of the joint section, & will have control of all trainmen, enginemen & other employes of both the G.T. & the Wabash, while engaged in the handling of trains, cars, or engines thereon. Officers, agents & employes of the Southern Division will be governed by the rules & regulations prescribed by the G.T. for the guidance & conduct of its own employes, & such other special rules as may from time to time be issued by the Joint Superintendent. The Joint Superintendent, operators, despatchers, agents & all others employed upon the repairs & maintenance, & in the operation of the Southern Division, are in the joint employ of the G.T. & Wabash Co.'s, & shall render to each Co. such services as they may be called upon to render within the scope of their position or employment, & shall be subject to dismissal if they decline, neglect or refuse to render such assistance or service to either Co. as such employes are usually called upon to render."

The freight traffic under the new arrangement has already commenced, but the Wabash passenger trains are still running via London & Hamilton, & probably will for two or three months, until the track east of Glencoe Jct. is improved so as to fit it for fast service.

The expense of maintenance & operation of the Southern Division will be borne jointly by the 2 roads, each of which will use it on an independent basis, in so far as the securing of business is concerned. Each will have its freight & passenger agents in the field, as though they were rival roads side by side. The usual amount will be paid by the Wabash road for the use of the tracks, based on the number of cars hauled & the amount of traffic carried. Stories that earnings are to be pooled by the 2 roads are denied by Messrs. Hays & Ramsey.

The Wabash also has the right to use the Erie belt line from the International Bridge at Fort Erie, around the city to the local freight houses, yards & tracks of the Wabash in Buffalo. The Wabash also has full rights in the use of this property equally with the Grand Trunk, & with the Erie from Suspension Bridge to Buffalo. It can take passenger, freight, mail or express traffic, local or through. Interchanges with G.T. lines are to be made at Black Rock, Suspension Bridge & Buffalo instead of at Detroit. Canada transit freight will be in bond. The Wabash has an equal & joint right with the G.T. in the use of the 2 ferry transfer boats between Windsor & Detroit.

By this arrangement the Wabash parallels the Michigan Central from Windsor to Buffalo & Suspension Bridge. Its mileage is 226.6 miles from Detroit to Suspension Bridge, as against 227.4 via Michigan Central, & 230 via the G.T., by way of London & Hamilton. From Chicago to Buffalo it has a much shorter line than either the Michigan Central or the Lake Shore, the mileage of the direct lines being as follows: Wabash, via Fort Erie, 512; Michigan Central, via Fort Erie, 520; Nickel Plate, 523; Wabash, via Niagara Falls & Suspension Bridge, 523; Michigan Central, via Suspension Bridge & Niagara Falls, 535; Lake Shore, 540; Grand Trunk, via Suspension Bridge, 541. From St. Louis to Buffalo the Wabash mileage, via Fort Erie, is 722; Wabash via Toledo & Lake Shore, 722; Big Four 731. The Wabash short line from Kansas city, via Hannibal & Decatur, to Buffalo is 949 miles, while the shortest line from Kansas City, via Chicago, is 981, & the shortest line, via St. Louis & the Big Four, is 1,008.

A prominent railway man in Detroit, speaking of the deal, said: "It is certainly a profitable one for the G.T., which has 3 lines between Detroit & the Niagara River, & it certainly cannot make them all pay. Mr. Hays' plan to induce the Wabash to take one was wise, & if he can dispose of the other in a similar manner he will do a great thing for his road. It is all right for the Wabash, too, for it can now get the long-looked-for outlet from the West & at the same time greatly assist the G.T. by turning freight over to it."

An official of the Wabash, said in an interview: "There will be a great change in the passenger arrangements between Chicago & Buffalo before long. The branch from Glencoe east has not been used very much lately, but it will now be greatly improved, & miles of the old track will be replaced with 80-lb. rails. After the road is fully repaired there will be an opportunity for good time between Chicago & Buffalo, and even New York. Our line will be the shortest from Chicago to Buffalo, & as the Erie road is making better time than the Empire State Express, between New York & Buffalo, it will be possible to make a connection with that road that will clip a slice from the time now made between New York, Buffalo, Detroit & Chicago.

Mr. Jones, who up to the date of his appointment as above, was Asst. Supt. of the Middle Division of the G. T. at London, is a former Wabash man. He took with him from London Chief Despatcher Wm. Armstrong to be Chief Despatcher of the new division, also despatchers A. B Munson, G. Clarke & F. Arnum. S. S. Russell, Secretary to Superintendent Fitzhugh, of the Middle Division, has gone as Mr. Jones' chief clerk. H. Ferguson, General Roadmaster of the Middle Division at London, & who also acts as General Roadmaster of the Southern Division, has appointed R. Bagnall Roadmaster between Windsor & St. Thomas, with office at Chatham; & W. G. Smith, Roadmaster between St. Thomas & Niagara Falls, & Welland Jct. & Black Rock, with office at St. Thomas.

G. R. Layher is appointed Local Freight Agent of the Wabash at Buffalo. He was formerly connected with that line at St. Louis, & for the past year has been agent for the G.T.R. at Buffalo & Black Rock.

T. J. Costello is appointed Trainmaster of the Wabash's Buffalo Division, office at Buffalo.

It is said the Rome, Watertown & Ogdensburg, Ontario Despatch, Lehigh & Wabash & Hoosac Tunnel freight lines will operate with the Wabash over the Southern Division. The Wabash will now send over the G.T. all freight that was hitherto turned over to the Nickel Plate, Lake Shore, B. & O. & M.C.R. Ten Wabash engines & 9 cabooses with the necessary tools were brought from Detroit to Windsor on Feb. 26, for the new line; the duty on them amounted to nearly $13,000.

The G.T.R. has been ferrying an average of 250 cars a day between Detroit & Windsor, & it is expected the 2 ferry boats will now have to carry as many or more for the Wabash.

Under the will of the late D. A. Stewart, C.E., engineer of the C.P.R. Western Division, the Winnipeg Free Kindergarten gets a bequest of $100.

C. B. Cumpston, chief train despatcher at Fort William, Ont., has been appointed assistant to C.P.R. Superintendent Niblock, of Medicine Hat, Assa. Mr. Cumpston is stationed at Calgary.

J. B. Lambkin, the newly-appointed passenger agent in Montreal for the Intercolonial R'y., was the hero of an interesting incident during the Fenian raid. He was then a trumpeter in the Ottawa Field Battery, & when the Battery was ordered to Prescott on active service he was considered too small to ride a horse, & was consequently under orders to stop at home. With this state of things, however, he was far from content, &, smuggling his uniform out of the house, he dressed himself in the old St. Lawrence & Ottawa Railway Station, afterwards stowing himself away in a freight car & was this way taken to Prescott, where he did duty with his Battery. Whilst a member of Princess Louise Dragoons at Ottawa, Mr. Lambkin was state herald to H.R.H. Princess Louise.

TRAFFIC & FINANCE.

C.P.R. Earnings & Expenses.

	January, 1898.
Gross Earnings	$1,672,372.04
Working Expenses	1,156,744.45
Net Profits	515,627.59

In Jan., 1897, the net profits were $373,343.10. The gain in net profits over the same period last year is, therefore, for Jan., $142,284.49.

The February traffic earnings were:

	1898	1897	Increasr.
1st to 7th	$385,000	$332,000	$53,000
7th to 14th	375,000	323,000	52,000
14th to 21st	351,000	310,000	41,000
21st to 28th	377,000	306,000	71,000
Increase			$217,000

C P.R. Land Sales.

The great improvement in Manitoba & the Northwest Territories is emphatically shown by the following figures:

	Acres.		Amount.	
	1898	1897	1898	1897
Jan.	22,044	9,943	$72,924.00	$33,872
Feb.	20,550	8,163	66,399.00	27,573

Grand Trunk Finances.

The Grand Trunk statement for the half-year ended Dec. 31, 1897, shows net earnings of $3,936,600. The surplus, after payment of all fixed charges is $1,336,500. This makes the total surplus for the year $1,349,622. The deficiency of $1,301,022, which was accumulated in the years preceding 1897, is thus cleared off, and about $50,000 remains to the good. This is rather better than was looked for.

The Canadian Gazette, London, Eng., says: The directors of the G.T.R. have issued a statement much more favorable than any put before the shareholders since 1893. In 1894, 1895 and 1896 there was a debit to revenue after providing for debenture interest, & at the end of 1896 it had got to £267,000. But so successful was 1897 that the whole of this adverse balance has been cleared off, & there is £10,200 to be carried forward. The guaranteed stock amounts to £5,219,000, & ranks for 4 %, so that but for the debit to revenue brought forward the full rate could have been paid, & as much left over as equals about 2 on the 1st preference.

The earnings for January & February were:

	1898	1897	Increase.
Jan.	$1,916,332	$1,639,614	$276,718
Feb.	1,674,453	1,522,246	152,207
			$428,925

The net earnings of the Quebec Central Ry. for '97 were $159,905, as against $128,311 for '96.

The Yukon & Stickeen River Trading & Transportation Co., Ltd., was registered in England, Feb. 8, with a capital of £50,000 in £1 shares.

The net earnings of the Minneapolis, St. Paul & Sault Ste. Marie Ry. for the 11 months to the end of Nov., '97, were $1,565,329, as against $1,397,098 for the corresponding period of '96.

The accounts of the Buffalo & Lake Huron Ry. Co. for the half-year ended December 31, show a disposable balance, after providing for interest on the bonded debt, of £14,210, which admits of the payment of a dividend of 5s. 3d. a share, leaving £425 undivided. This line is leased in perpetuity to the Grand Trunk for a rental of £70,000 a year. The annual dividends for the past 31 years have been the same, 5s. 3d. a share. The £10 shares are quoted at 13½ to 14, & the 1st. & 2nd. mortgage 5½ per cent. bonds, both of which are irredeemable, at 142 to 145.

OFFICIAL RAILWAY CIRCULARS.

Canada Atlantic.

CANADA ATLANTIC TRANSIT CO., Operated by C.A.R. Co. OTTAWA, Jan. 15., Geo. J. Harris is appointed General Western Agent of these Companies, with office in Chicago, Ill., Wheeler Building, No 6 Sherman Street, Room 35. C. J. Smith, General Freight Agent; Approved, E. J. Chamberlin, General Manager.

CANADA ATLANTIC TRANSIT CO., Operated by C.A.R. Co. OTTAWA, Jan. 25. The following appointments take effect Feb. 1; Jas. Ritchie, General Eastern Agent; C. H. Hurlburt, New England Travelling Agent; D. A. Kimball, Contracting Agent; with office at 196 Washington Street, Boston, Mass. C. J. Smith, General Freight Agent; Approved, E. J. Chamberlin, General Manager.

CANADA ATLANTIC FAST FREIGHT LINE, OTTAWA, Jan. 25. Jas. Ritchie is appointed General Eastern Agent, effective Feb. 1, vice Royal Whiton, resigned. Commencing at once, all traffic in bond for export via Boston should be consigned in care of Mr. Ritchie, 196 Washington Street, Boston, Mass., to whom all communications respecting export traffic, also copies of way-bills & through bills of lading should be addressed. G.T.R. circular 817, of Sep. 16, 1895, & C. A. F. F. Line east bound billing list No. L. 1 should be amended accordingly. C. J. Smith, Line Manager.

Canadian Government.

MONTREAL, Jan. 22. The jurisdiction of the General Freight & General Passenger Agents of the Intercolonial R'y is extended over the Prince Edward Island R'y. Effective Feb. 1. A. H. Harris, General Traffic Manager.

MONTREAL, Jan. 22. J. Campbell is appointed Car Accountant of the System, with headquarters at Moncton, N.B. Effective Feb. 1. A. H. Harris, General Traffic Manager.

MONCTON, N.B., Jan. 22. Jas. B. Lambkin is appointed District Passenger Agent, with headquarters at Montreal, in charge of all passenger matters West of Dalhousie, N.B., inclusive. H. A. Price is appointed District Passenger Agent, with headquarters at 132 Hollis Street, Halifax, N.S., in charge of all passenger matters East of Dalhousie, N.B. Effective Feb. 1. Jno. M. Lyons, Gen. Pass. & Ticket Agent. Approved: A. H. Harris, General Traffic Manager.

MONCTON, N.B., Jan. 22. A. W. Morrison is appointed General Baggage Agent of the System, with headquarters at Moncton, N.B. Effective Feb. 1. Jno. M. Lyons, Gen. Pass. & Ticket Agent. Approved: A. H. Harris, General Traffic Manager.

MONCTON, N.B., Jan. 22. Jas. Hardwell is appointed Division Freight Agent, with head quarters at Board of Trade Building, Montreal, in charge of freight matters in connection with the System West of & including Dalhousie, N.B. He will also act as Foreign Freight Agent. Wm. Robinson is appointed Division Freight Agent, with headquarters at St. John,

N.B. in charge of the System St. John to Moncton inclusive, & North of Moncton to & including Eel River, N.B., also Point du Chene Branch & the Prince Edward Island Ry. Agents East of Moncton will continue to report direct to, & receive their instructions from, this office as heretofore. Effective Feb. 1. J. J, Wallace, General Freight Agent. Approved: A. H. Harris, General Traffic Manager.

MONCTON, N.B., Jan. 22. Owen Cameron is appointed Freight Claim Agent of the System, with headquarters at Moncton, N.B. All communications as to claims for loss, damage, overcharges, etc., should be addressed to him. Effective Feb. 1. J. J. Wallace, General Freight Agent. Approved: A. H. Harris, General Traffic Manager.

MONCTON, N.B., Jan. 22. H. H. Schaeffer is appointed Weighing Inspector, and J. F. Nelles, Assistant Weighing Inspector, with headquarters at Moncton, N.B. Effective Feb. 1. J. J. Wallace, General Freight Agent. Approved: A. H. Harris, General Traffic Manager.

Grand Trunk.

WESTERN DIVISION, DETROIT, MICH., Jan. 17. The following changes take effect this date: A. R. McIntyre, Asst. Superintentendent in charge of train, car & telegraph service on all districts; office, Battle Creek. F. L. Corwin is appointed Trainmaster 27th, 28th and 29th districts, including also C. S. & M. portion of 25th district; office, Detroit. V. A. Cooper has been assigned to other duties. A. B. Atwater, Supt.; Approved, F. H. McGuigan, Genl. Supt.

MONTREAL, Feb. 15. Marshall C. Sturtevant is appointed Car Service Agent, headquarters at Montreal, with full charge of distribution & use of all passenger & freight car equipment of this System, & of foreign cars upon this Co.'s lines, including the prompt loading, unloading & forwarding of cars, giving special attention to movement of manifest or time freight, & trains carrying the same. He will also order all foreign cars required, & officers of other roads are requested to communicate with him when in want of G. T. System equipment. Division officers will comply with his instructions relative to movement & distribution of cars, & movement of time freight. All reports relative to car mileage & accounts will be sent, as heretofore, to W. H. Rosevear, General Car Accountant, Montreal. Effective Feb. 15. F. H. McGuigan, Gen'l Supt.; Approved, Chas. M. Hays, Gen'l Manager.

TO ALL CONNECTIONS. MONTREAL, Feb. 23. The G.T.R. having leased to the Wabash R'y Co. for a long term of years the joint use of that portion of its railway between Windsor, Ont., and Black Rock station (Buffalo), N.Y., via Glencoe, St. Thomas, Welland Jct. and Fort Erie, also between Welland Jct. (via Allanburg Jct.) & Suspension Bridge, N.Y., the Wabash Co. will, on & after March 1, be entitled to the revenues accruing in connection with the operation of its own trains over the joint section specified—which will thereafter be known as the "Southern Division" of the G.T.R. All communications in connection with the business of the Wabash Ry., over the line referred to, should be addressed direct to the officers of that Co. at St. Louis, Mo. The above arrangements will make no change in the relations now existing between the G.T.R. and its connections, except as they may be hereafter advised. Chas. M. Hays, Genl. Mgr.

MIDDLE DIVISION, TORONTO, Feb. 28. The following changes and appointments are effective Mar. 1:

L J. Ferritor, Asst. Supt., vice G. C. Jones, promoted. Office, London.

C. S. Cunningham, Trainmaster. Toronto to Hamilton; Burlington Jct. to Hamilton; Niagara Falls to Sarnia Tunnel; Komoka to Kingscourt Jct. via Glencoe; Welland Branch; Harrisburg to Tilsonburg Jct.; Petrolia Branch; & Middle Division crews running over joint track—Southern Division. Office, London.

A. S. Begg, Trainmaster. Toronto to Sarnia Tunnel via Stratford; Galt & Elmira Branches; London & St. Mary's Branch; Buffalo to Goderich; Hamilton to Port Dover; Port Dover to Tavistock Jct.; Port Rowan Branch. Office, Stratford.

H. E. Whittenberger, Trainmaster. Harrisburg to Southhampton; Harriston to Owen Sound; Parkhead Jct. to Wiarton; Stratford to Palmerston; Listowel to Kincardine; Palmerston to Durham; Hyde Park to Wingham Jct. Office, Stratford.

J.A. McLardy, Chief Train Despatcher. Toronto to Hamilton; Burlington Jct. to Hamilton; Niagara Falls to Sarnia Tunnel; Komoka to Kingscourt Jct. via Glencoe; Welland Branch; Harrisburg to Tilsonburg Jct.; Petrolia Branch. Office, London.

Joseph Baxter, Chief Train Despatcher. Toronto to Sarnia Tunnel via Stratford; Galt & Elmira Branches; London & St. Mary's Branch; Buffalo to Goderich; Hamilton to Port Dover; Port Dover to Tavistock Jct.; Port Rowan Branch; Harrisburg to Southampton; Harriston to Owen Sound; Parkhead Jct. to Wiarton; Stratford to Palmerston; Listowel to Kincardine; Palmerston to Durham; Hyde Park to Wingham Jct. Office, Stratford.

E. H. Fitzhugh, Supt. Approved, F. H. McGuigan, Genl. Supt.

MIDDLE DIVISION, LONDON, Feb. 28. Roadmasters, T. Turner & P. Nelson having resigned, & R. Bagnall & W. G. Smith being transferred, the following changes & appointments are effective Mar. 1:

A. Bruce, Roadmaster, Stratford. North Parkdale to Sarnia Tunnel; Galt & Elmira Branches; London & St. Mary's Branch.

J. Piper, Roadmaster, Toronto. York to Hamilton; Burlington Jct. to Hamilton; Stoney Creek Cut-off; Hamilton to Port Dover.

J. Carey, Roadmaster, Hamilton. Suspension Bridge to London; Welland Branch.

W. Young, Roadmaster, Sarnia. London to Sarnia Tunnel; Komoka to Kingscourt Jct., via Glencoe; Petrolia Branch; Point Edward Branch.

W. McGar, Roadmaster, Stratford. Buffalo to Goderich; Stratford to Listowel.

T. Lockhart, Roadmaster, Palmerston. Guelph Jct. to Southampton; Harriston to Owen Sound; Parkhead Jct. to Wiarton.

P. Earle, Acting-Roadmaster, Brantford. Tavistock Jct. to Port Dover; Port Rowan Branch; Tilsonburg Jct. to Harrisburg; Harrisburg to Guelph Jct.

C. Dallas, Roadmaster, Wingham. Palmerston to Durham; Palmerston to Kincardine; Hyde Park to Wingham Jct.

H. Ferguson, Genl. Roadmaster. Approved, E. H. Fitzhugh, Supt.

Wabash.

BUFFALO DIVISION. BUFFALO, N.Y., Feb. 21. T. J. Costello is appointed Trainmaster of Buffalo Division, office Buffalo, N.Y. Effective Mar. 1. A. E. Robbins, Supt.; approved, H. L. Magee, Genl. Supt.

BUFFALO DIVISION. BUFFALO, N.Y., Mar. 1, effective this date. J. E. Muhlfeld is appointed General Foreman of Machinery & Car Department, office at St. Thomas, Ont. A. E. Robbins, Supt.; approved, H. L. Magee, Genl. Supt.; J. B. Barnes, Supt. Motive Power & Machinery.

GENERAL CLAIM DEPARTMENT. ST. LOUIS MO., Mar. 1. J. L. Head, Assistant Claim Agent, Peru, Ind., will have charge of settlement of Wabash stock & fire claims on Buffalo Division of this Co.'s lines. All reports of stock struck & fires set out along right-of-way by Wabash trains will be sent to him at Peru, through the offices of the Master Mechanic & General Roadmaster respectively. Henry A. Lloyd, Genl. Claim Agt.; approved, J. Rumsey, Jr., Vice-Pres. & Genl. Mgr.

PERSONAL MENTION.

R. A. Corbett, C.P.R. station agent at Fort William, Ont., has been appointed that company's ticket agent at Skagway, Yukon district. A. J. Boreham, of the C.P.R.'s Winnipeg ticket office, succeeds him at Fort William.

Heretofore the C.P.R. has had three city freight canvassing agents in Toronto, C. W. & H. C. McMullen & W. Bain. Under date of Jan. 24, General Freight Agent Tiffin announced the appointment of C. W. McMullen as city freight agent, in charge of all city canvassing, with office at room 208, Union Station. The other two canvassers are retained & will report to him.

Mrs. W. R. Tiffin, wife of the G.T.R. Superintendent at Allandale, Ont., died suddenly on Feb. 21, during her husband's absence from home. She was about to retire for the night, when she fell, dying almost immediately. She was 50 years of age, & leaves 3 sons. The funeral took place at London, a special train conveying the body, mourners & a number of friends from Allandale, Barrie & Toronto.

The Hamilton Bridge Works Company.

These works, under the management of Henry Szlapka, Chief Engineer, have a decidedly business-like appearance these days. The shops, which are running to their utmost capacity, are under the supervision of A. Phœnix, Superintendent, whose energy keeps things humming. The Co. has been most successful in obtaining large contracts for heavy railway bridges for the C.P. & G.T.R., & other railway corporations. The Queen St. subway, Toronto, was lately built by this Co. The centre girder for the Grand Trunk double track crossing alone weighed 80,000 lbs., length 96 ft. overall, & 10 ft. 6 in. deep, shipped from the works in one piece. The most important & difficult contract ever undertaken by this Co., was the building & erecting of the Stoney Creek arch for the C.P.R. in the Selkirk Mountains, a stupendous task. As for highway bridges wood has been nearly entirely superseded by steel. Steel highway bridges are thoroughly in evidence in these works. Structural work, in which steel has also taken so prominent a place of late, forms a large item in its output, & the Simpson building in Toronto bears testimony to this statement. The Co. does a large business outside of bridge building. It is now busy with an extensive steel roof for the Western Departmental block at Ottawa to replace the wooden roof which was burnt off. The metal work for the Soulanges Canal lock gates is also another large Government contract. The Co. also has a contract for the feeder pipes, about 8 ft. in diameter, & for the power house of the Cataract Power Co., of Hamilton, which proposes to bring electric power from St. Catherines to Hamilton. A large assortment of exceedingly heavy rods for bridges on the C.P.R. Crow's Nest Pass Branch have recently been turned out. There are under way a number of other miscellaneous structures. The steel hull of the steamer Chippewa, the finest of the Niagara Navigation Co's fleet, plying between Toronto and Niagara, was built at the Hamilton Bridge Works. The Co. is under the control of the Messrs. Hendrie, whose energy & pluck in taking hold of large undertakings is well known.

TELEGRAPHS & CABLES.

Vancouver Island Cables.

The first telegraph connection with Vancouver Island belonged to the Western Union Telegraph Co., consisting of a cable 16 miles in length, between the then territory of Washington, via San Juan Island, & Vancouver Island. It was removed after the laying of the Dominion Government cables as mentioned below.

The present cables were laid by the Dominion Government in 1881, & were taken over by the C.P.R. Co. in 1886. The route of the present line from Vancouver to Victoria is as follows: Pole line through the woods from Vancouver to Point Grey, 12 miles; 24 miles of cable from there to Valdez Island; pole line along that island through the woods for about 3 miles; cross over to Gabriola Island by a long aerial span; pole line for 6 miles along a roadway on the island; 1 mile of cable to Vancouver Island, landing at a point about 10 miles south-east of Nanaimo; pole line through the woods to Nanaimo, & thence along the E. & N. Ry. to Victoria. The conductor in these cables is composed of 7 strands of copper wire, weighing 107 lbs. per knot; insulator, 150 lbs.; & a sheathing, over an adequate serving, of 12 no. 8 or 9 galvanized iron wires.

Between Gabriola & Valdez Islands the currents are so swift & the bottom so rocky that a cable cannot be used, & recourse was had to a long aerial span, supported on trees about 200 ft. in height, with the branches & tops cut off so as to present a small surface to the wind. An extra span on two other trees is maintained, so that, in case of the one in use breaking, communication can be quickly regained. The repair of these spans is carried on under great difficulty. The wire can only be carried across at slack water, which lasts only a few minutes at turn of tide, & it must be raised free of the water before the tide turns or it will be either broken or carried away. Sometimes a week is spent before the wire can be successfully erected. The land line stretches between Vancouver & Nanaimo have been subject to considerable interruption from falling trees, etc., & owing to their great height, it is out of the question to cut a trail wide enough to be free from this annoyance. To have repairs made as quickly as possible, line men are stationed at Vancouver, Valdez Island, Nanaimo, & latterly on Gabriola Island.

To avoid the difficulty & danger of frequent interruptions, the C.P.R. Co. concluded last year to lay a cable the whole way from Vancouver city to Nanaimo, a distance of 40 miles. The old cable had only one conductor, which was sufficient to carry all the business of Vancouver Island, but looking forward to the large increase expected by the people of Victoria, owing to the Yukon excitement, & the development of the mineral resources of the island, it was decided to lay a three conductor cable. One of these conductors will connect at Nanaimo with a through wire to Victoria, & will be quadruplexed, so that four messages can be simultaneously transmitted over the one circuit. The second cable conductor will be connected with a second wire through to Victoria, giving communication with all intermediate offices, & in case the quadruplex cannot carry the entire business of Victoria, this will furnish a fifth circuit. The third cable conductor will, for a time at least, be used for Nanaimo business with the Mainland, but if necessary will be carried to Victoria with a third wire & quadruplexed.

The cable has been made by the Telegraph Construction & Maintenance Co., London, Eng. It was originally intended to bring it by steamship from London to Halifax, & then across the continent by rail. To accomplish this, the cable would have had to be coiled in a tank on the steamship so that each turn would average the same length as when coiled on the cars after being transhipped at Halifax, so as to avoid kinks. It weighs about 220 tons, & would require a train of 13 or 14 cars to transport it. This was quite a proposition, as any accident happening to the train would perhaps ruin the cable. However, the C.P.R. recently purchased two steamships in England for use on the Yukon route, & as they were to leave London about the time the cable would be finished, the original shipping instructions were cancelled, & arrangements made to transport the cable by SS. Tartar direct from London to Vancouver, & it is now on the way.

Although actually only 40 miles of cable are required for the work, 45 miles have been secured. The cable will be laid almost immediately on its arrival. The following is a portion of the specifications for the manufacture of the cable: Each of the 3 conductors to be composed of 7 strands of copper wire twisted together, containing not less than 98 per cent. of pure copper, & weighing 100 lbs. per nautical mile. Each conductor is then insulated with gutta-percha weighing 100 lbs. per nautical mile, & then served spirally with a saturated tape. The 3 insulated conductors are then twisted together & served with the best tanned jute, free from knots, & with 14 best extra galvanized iron wires, .203 of an inch in diameter, each sheathing wire to be treated with bituminous compound, & the sheathed cable to be covered with two coatings of tape, laid on in opposite directions, & saturated with compound. The insulation resistance of each conductor to be not less than 4,000 megohms per nautical mile.

THE WESTERN UNION TELEGRAPH CO.,

with which the Great North Western Telegraph Co. connects, is extending its wires from Seattle, Wash., to Victoria, B.C. The work between Seattle & Port Angeles is proceeding as rapidly as possible. The cable, which will be laid from Port Angeles to Victoria, has been ordered, & it is expected that communication will be had with that place by this new route in the course of a few weeks.

C.P.R. Telegraph Improvements.

Not many years ago it was quite a feat to work a telegraph wire for a greater distance than, for instance, Montreal to Toronto; & in bad weather it was difficult to work even half that distance. Better construction improved this, & the invention of automatic repeaters still further extended the working distance. It was found that circuits requiring more than two automatic repeaters were unsatisfactory. To lengthen out the different sections recourse was had to larger wires (iron), the size being increased by steps from 300 to 570 lbs. a mile.

Copper is only about one-sixth of the length (electrically) of iron; but its use was for a long time prevented by the much greater cost of the material, & the fact that, owing to its delicate nature, it had to be handled with extreme care; the cost of stringing it is nearly double that of iron. The telegraph business has increased so enormously of late years between important centers that many more wires have had to be erected, & stringing heavy iron wires had to be discontinued & light copper wires became a necessity. The size has been gradually increased.

The Yukon excitement, & the greater prosperity now prevailing throughout Canada, has resulted in an enormous increase of the telegraph business between the far West & Eastern Canada, & the present facilities of the Canadian Pacific Railway Co.'s Telegraph will probably be insufficient to carry it during the coming summer, therefore the Co. has decided to largely increase them. In addition to numbers of new wires connecting intermediate points, a through wire from Montreal to Vancouver is to be erected immediately. In order to get the greatest amount of work out of this wire it is to be composed of copper, weighing 300 lbs. a mile. It is being manufactured by the Dominion Wire Manufacturing Co. at Lachine, according to specifications drawn up for the highest grade that can be obtained, & will be subjected to severe mechanical & electrical tests before shipment. When completed the wire will cost in the neighborhood of a quarter of a million dollars, the total weight of copper being about 440 tons.

It will be used only for business between the east & the Pacific Coast, Montreal working direct with Vancouver, with automatic repeaters at Fort William, Ont., & Swift Current, Assa. This wire will be worked duplex, i.e., two messages transmitted at the same time in opposite directions. At present Montreal works direct with Winnipeg, with repeaters at Sudbury and Fort William, & all messages are received & re-transmitted at Winnipeg; but with the new wire Vancouver will be brought as close, practically, to Montreal as Ottawa is.

It is expected that between 200 & 250 men, divided into gangs of 20 each, will be engaged on this work.

Telegraph Office Changes.

GREAT NORTHWESTERN.

Offices opened: St. Michel Station, Que.; Cascades Point, Que.

Offices closed: St. David's, Ont.; Winthrop, Ont.; Osnabruck Centre, Ont.; Rosebank, Man.

CANADIAN PACIFIC.

Offices opened: Comaplix, B.C.; Esquimalt, B.C.; Harrison, B.C.; Notch Hill, B.C.; Lear Springs, B.C.; Seventh Siding, Crow's Nest Pass Ry., Alta.; Anson, Ont.

Offices closed: Bird's Hill, Man.; Caron, Alta.; Cheney, Ont.; Dinorwick, Hoard's Station, Ont.; Kenilworth, Ont.; Deschambault Station, Que.; Vaucluse, Que.

Cow Bay, N.S., has been changed to Port Morien.

At Qu'Appelle, Assa., recently, Hartley Gisborne, for the past 16 years District Superintendent of Government telegraph lines in the Northwest Territories, was presented with an address & silver tea-set by the employes of the service, on his leaving it in consequence of J. S. Macdonald, of Moose Jaw, having been appointed in his stead. Mr. Gisborne is removing to Winnipeg.

J. Galt, W. Hespeler, R. J. Campbell, F. A. Drummond & F. W. Heubach give notice of their intention to apply for incorporation under the Manitoba statutes, under the name of the Manitoba District Telegraph & Delivery Co., to maintain & lease electric call boxes, to supply messengers, to deliver parcels, collect accounts, post bills & distribute handbills, & to print & publish the same. The head office is to be at Winnipeg; capital stock $10,000.

The Commercial Cable Co's report for 1897 gives the revenue from operating the cables, after deducting all expenses & reserving $11,750 to meet depreciation of spare cable, as $1,200,155.53, as compared with $1,123,653.46 for 1896, an increase of $76,502.07. The revenue from the land lines, after deducting all operating expenses & setting aside $60,000 to a land lines depreciation reserve account, amounted to $645,185.59. The net revenue of the combined systems was $1,845,341.12, out of which has been met the interest on the 1st mortgage bonds & debenture stock amounting to $640,000, & dividends of 7% & bonus of 1% on the capital stock, absorbing $800,000, a total of $1,440,000, and leaving the balance of net revenue for the year $405,341.12.

NOTICES TO MARINERS.

Dominion Department of Marine and Fisheries.

All bearings, unless otherwise noted, are magnetic & are given from seaward; miles are nautical miles; heights are above high water, & all depths are at mean low water.

No. 8, Feb. 1, Wreck of Gerona.—The position of the steamer Gerona which sank on Jan. 1 last, between Seal Island & Cape Sable Island, off the S.W. coast of Nova Scotia, has been fixed by the Master of the Dominion steamer Newfield. The wreck lies in 20 fathoms water with Bon Portage light bearing N. E. by E, ¼ E., distant 5½ miles. Sealing Island light bearing W. by N. ¾ N., distant 8 miles. Cape Sable light bearing E. by S. ¼ S., distant 9 miles. When the wreck was examined the 2 top-mast heads of the vessel showed about 11 feet above water at low tide. It is proposed to moor a green iron can buoy about 50 yds. S.S.W. from the wreck. This affects Admiralty chart 335.

No. 9, Feb. 15—1. Beacon Rock beacon, Nanaimo, destroyed.—The beacon on Beacon Rock, in Nanaimo harbor, Vancouver Island, B.C., was destroyed by collision with the steamer Willapa on the night of January 26th. A platform buoy, with cage, has been moored on the rock pending the re-erection of the beacon. This affects Admiralty charts 573 & 2512, & B.C. pilot, 1888, pg. 145.

2. Red sector in Cape Beale light.—The revolving white light shown from Cape Beale light station, at the entrance to Baynes Sound, Pacific coast of Vancouver Island, has heretofore been obscured to the northward of an east bearing, so that vessels losing the light were warned that they were approaching foul ground. From & after May 1 next the light will be rearranged so as to show revolving red into Barclay Sound, between the bearings of east & approximately S. S. E. Vessels are warned that within the sector of the red light there are numerous dangers. The sector of white light will remain as heretofore. This affects Admiralty charts 584, 592, 1911, 1917 & 2531, B.C. pilot, 1888, pg. 274, and Canadian list of lights & fog signals, no. 1161.

No. 10, Feb. 16—1. Increased Height of Palmers wharf light.—The mast light established in 1894 on Palmers wharf, Crapaud harbor, was last year raised 10 ft. in height, & is now elevated 20 ft. above high water mark. The mast carrying the lantern from which the light is shown is 18 ft. high, from the wharf to its top. This affects Admiralty charts 1651, 2000 & 2034 & Canadian list of lights & fog signals, 1887, no. 375.

2. Height of mast, Wrights range.—The mast on which the lantern of Wright's front range light, in the same harbor, is hoisted is 11 ft. high from its base to the top of the slatwork. This affects Canadian list of lights & fog signals, 1887, no. 373.

3. Change in illuminating apparatus, St. Peters Island light.—Referring to notice to mariners no. 2 of 1897, mariners are advised that on the opening of navigation in the spring of 1898 the fixed red light heretofore shown from the lighthouse on St. Peters Island, Hillsborough Bay, will be replaced by an occulting white light, giving an occultation of 6 seconds every ½ minute. The illuminating apparatus will be dioptric of the 6th order. The light should be visible 14 miles from all points of approach, except where obstructed by the high ground of St. Peters Island. This affects Admiralty charts 1651, 1738, 2034 & 2516 & Canadian list of lights, 1897, no. 370.

No. 11, Feb. 24—Port Elgin Range Lights.—The information given in notice no. 5 of 1898 with regard to the Port Elgin range lights having been found to be incomplete, & in some respects inaccurate, it is cancelled, & replaced by the following: Instead of the single light at Port Elgin, on the east shore of Lake Huron, described in list of lights, 1897, under the no. 993, there are now 2 pairs of range lights, arranged to lead into the port hrough the deepest channel. All 4 lights are shown from lanterns hoisted on masts, with sheds at their bases. Before the opening of navigation in 1898 the masts & sheds will be painted white. The front mast of the south range stands upon the shore line about 1,500 ft. southwardly from the south end of the Government landing wharf. Approximate position, taken from Admiralty chart no. 519: Lat. N. 44° 26′ 15″, Long. W. 81° 23′ 30″. The mast is 14 ft. high. The light is a fixed white light, elevated 16 ft. above the ordinary level of the lake, & should be visible 4 miles in the line of range. The illuminating apparatus consists of a pressed glass lens. This light was established in 1895. The back mast of the south range stands 70 ft. E.S.E. from the front one. It is 18 ft. high. The light is a fixed red light, elevated 20 ft. above the lake & should be visible 4 miles in the line of range. The illuminating apparatus consists of a pressed glass lens. This light was established in 1895. The front mast of the east range stands on the Government landing wharf, near its north-east extremity. It is 14 ft. high. The light is a fixed white light, elevated 23 ft. above the lake, & should be visible 9 miles from all points of approach by water. The illuminating apparatus is dioptric of the 7th order. This light was established in 1884, but has since been moved. The back mast of the east range stands on the shore on the east side of the harbour, 680 ft. N.E. from the front mast, & is 16 ft. high. The light is fixed red, elevated 25 ft. above the lake, & should be visible 4 miles in the line of range. The illuminating apparatus consists of a pressed glass lens. This light was established in 1895. Vessels entering Port Elgin should bring the south range lights in one, & stand in on the range until the east range lights are brought in one, & then follow the east range into the dredged harbour between the breakwater & the landing wharf, leaving the front light on the starboard hand, to clear the wharf. This notice affects Admiralty charts 519 & 678, & the substance of it should be entered in the Canadian list of lights & fog signals instead of no. 993.

British Columbia Inland Steamers.

The C.P.R. Co's fleet on the inland waters of B.C. has already assumed pretty extensive proportions. On the Columbia River & Arrow Lakes, between Arrowhead & Trail, the Co. has the following:—The Lytton, taken over from the Columbia & Kootenay Navigation Co., 150 ft. long, capacity about 50 passengers & 100 tons freight. Her sister boat, the Nakusp, was burned last fall, & will be replaced by the Co. at an early date. The Kootenay, built at Nakusp last year, length. 180 ft., accommodation for about 130 passengers and 300 tons freight. The Rossland, recently completed at Nakusp, length 180 ft., with accommodation for about 75 passengers. She is intended for passengers, mails & express only & will make fast time. The Trail, a freight boat, about 170 ft. long, capacity about 300 tons freight. The tug-boat Columbia tows the transfer scow from Arrowhead to Nakusp, where connection is made with the Kaslo & Slocan Ry. without breaking bulk. The transfer scow carries 8 cars. There are also 12 scows which carry bulk freight between Arrowhead, Robson & Trail.

On Kootenay Lake are 2 steamers, the Nelson & Kookanee, each about 160 ft. long, with capacity for about 75 passengers each & about 200 tons of freight. The Kookanee is a pretty fast boat. There are also a number of scows. The Co. is now building at Nelson a tug, & a transfer barge with a capacity of 12 cars, to ferry between the temporary terminus of the Crow's Nest Branch, at the southeast end of Kootenay Lake & Nelson, where connection will be made with the Co's Columbia & Kootenay branch.

On Slocan Lake the Slocan, length about 150 ft., freight capacity about 150 tons, is a day boat, with limited sleeping accommodation, say for from 25 to 30 people. She runs between Rosebery, on the Nakusp & Slocan Ry., & Slocan City, the terminus of the Slocan Lake branch of the Columbia & Kootenay Ry. There is also a small boat, the Wm. Hunter, & a car barge.

On Okanagan Lake is the steamer Aberdeen, running between Okanagan Landing & Penticton.

The Polson Iron Works.

This Toronto firm has a lot of marine & other work on hand. The principal contract is for a flat-bottomed stern-wheel steamboat for the C.P.R. for use on the Stikine River, & one for another company for the Stewart River, reference to which appears on another page of this issue. The firm is also building machinery to be put in another Stikine River boat, which the C.P.R. is building at Vancouver.

The following marine work is also under construction: Fore & aft compound surface condensing engine for Capt. French, New Westminster, B.C.; fore & aft compound surface condensing engine for Capt. Mahers, New Westminster, B.C.; fore & aft compound jet condensing engine for the Brockville, Ont., Navigation Co.; large marine boiler for H. West, New Westminster, B.C.; composite steam launch for T. Eaton, Toronto, for use in the Muskoka Lakes, to make a speed of 16 miles an hour.

Among its general work under way is the following: 250 H.P. high speed engine & 2 large locomotive boilers for the Crow's Nest Pass Coal Co.; power plant for the Stewart, Hartshorn Co., window shade roller manufacturers, Toronto; three Heine safety boilers, 250 H.P. each, for the Toronto Electric Light Co.; one Heine safety boiler, 250 H.P., for the Gutta Percha Rubber Co., Toronto, and 1 of 150 H.P. for the T. Eaton Co., Toronto.

Canadian Pacific Navigation Co.

The C.P.N. Co. is arranging for the shipment of goods direct to Dawson City without touching at a U. S. port, the object being to avoid bonding privileges or other customs arrangements. The navigation of the Stikine River, through the strip of Alaska at the mouth, is by virtue of treaty rights as free to Canadians as to United Statesers. Taking advantage of this, the C.P.N. Co. intends to run a line of small steamers from Port Simpson up the Stikine River. Connection will be made with these steamers by the Co's vessels from Vancouver & Victoria, & Wrangel will not be touched at all. The trade now being built up there will thus be partially diverted to Port Simpson.

It is recalled that several years ago a steamer, the Western Slope, ran from Port Simpson right up the Stikine to the Canadian line, & in 1878, when the U. S. Government began to show a somewhat similar spirit to what it is doing now, of trying to prevent Canadian vessels doing any of the carrying trade, the steamer ran on the Stikine for two seasons. The vessels the C.P.N. intends to utilize include the R. P. Rithet, Yosemite & some others.

The C.P.R. Co.'s R.M.S. Empress of India, passed through a hurricane during the second week of February. Her bridge was wrecked & library stove in, but $500 has repaired all damage.

Marine Notes of Interest.

The S. S. Algonquin is being repaired at Toronto, under the supervision of Captains McMaugh & Crangle.

Mrs. Thomas Donnelly, wife of the Government Steamboat Inspector at Kingston, Ont., died suddenly Mar. 2, aged 40.

The Department of Public Works has asked tenders for constructing a wharf & approach at Honora Bay, Manitoulin Island, Ont.

Dr. R. S. McMunn, of Winnipeg, has been appointed ship-surgeon on the R. M. S. Warrimoo, sailing between Vancouver & Australia.

Troop & Son, St. John, N.B., have placed an order in England for building a steel steamer, 300 ft. long, 45 ft. beam, to be named the Canada.

A steamboat is being built at Fort Frances, Ont., by Coates & Mosher to ply on Rainy Lake, between Mine Centre, Rainy Lake City and Bell City.

A. J. Corriveau, of Montreal, and others are making application to the Dominion Parliament to incorporate the Montreal & Lake Champlain Canal Co.

The Donnelly Dredging & Salvage Co., of Kingston, has ordered 2 new 10 in. centrifugal pumps from London, Eng., each having a capacity of 3,500 gallons a minute.

The Kingston, Ont., Locomotive Works recently launched a steel barge, the Coburg, 180 ft. long, 35 ft. beam, & to carry 50,000 bushels of grain on a draft of 11 ft.

The Dominion Government, in view of the greatly increased fleet now on the Pacific, is taking measures to ensure much more rigid inspection of ships sailing from B.C. ports.

Chief Engineer Black, last season in the Steamer Hamilton, has been transferred to the steamer now building for the Richelieu & Ontario Navigation Co., & is superintending the construction of the machinery.

The Hudson's Bay Co's. business between Hudson's Bay & England is done by the Erik, which leaves London about the end of May & goes to Fort Churchill by way of the Labrador coast & Hudson's Straits, for the Co's. business only.

The Propeller Persia has been acquired by W. A. Geddes of Toronto & Jacques of Montreal, Capt. Crangle & J. H. G. Hagarty, of Toronto, having sold their interest. The Persia, under command of Capt. Scott, will run on the Montreal-Toronto route with the Ocean.

The customs statistics at Fort William, Ont. for 1897 are: Total vessels, 429; tonnage, 557,179; bushels of wheat shipped, 16,711,226; oats, 215,805; barley, 11,959; flax, 96,376; flour, 83,078; barrels pulpwood, 714 tons; coal arrived, 138,134 tons; duty collected, $97,666.77.

For several weeks rumors have been in circulation to the effect that the Ogdensburg & Chicago Transit Company boats would not run to Ogdensburg; but, instead, would run in connection with the Canada Atlantic Ry. It is now said the Transit boats will run to Ogdensburg this season as usual.

The North Shore Navigation Co.'s steamer City of Collingwood, & the Great Northern Transit Co.'s steamer Majestic, will form a line this season from Collingwood & Owen Sound, going via the north of Manitoulin Island to Sault Ste. Marie, Port Arthur, Fort William, Duluth & intermediate ports.

The C.P.R. Co. has purchased the Troup wharf & warehouses at Wrangel, Alaska, for $12,000. The wharf is to be extended to 600 ft. in length, with a width of 60 ft., & necessary shed accommodation is to be built in connection with the C.P.R. boats to Telegraph Creek. Wrangel is reported to be a lively place, & buildings bring fancy prices.

The tug being built by Capt. Angus Campbell Elliot & Hale at Nelson, B. C., will be completed about the middle of March. It is 80 ft. long, 14 ft. beam with 6½ ft. draft of water. The machinery is now on the road from Ontario, & when completed the tug will be one of the best boats of its kind on the inland waters of B.C. It will be used for towing on Kootenay Lake.

The steamer Rosedale, which ran ashore, & is now in drydock at Kingston, Ont., has been sold by the underwriters to the Edwardsburg Starch Co. of Cardinal. There were several tenders put in for the steamer, the former owners, Hagarty & Crangle, of Toronto, making an offer. The Rosedale will be repaired at once & will be again sailed this season by Capt. Ewart.

The steamer Filgate, running between Montreal & L'Isle Grosbois, & the steamer Chateauguay, running between Chateauguay & Lachine were put up at auction in Montreal, Feb. 15, the Filgate being placed on the list at a valuation of $25,000 & the Chateuguay at $22,000. The Filgate fell to R. Gagnon for $8,500 & the Chateauguay was bid in by Mr. Rodier at the same figure.

The steamer Shrewsbury has been purchased by the Thousand Island Steamboat Co. from Buffalo parties. She is a very fine & fast steamer, classing A1, built at Bath, Maine, in 1888, at a cost of $85,000, & will be an important addition to the Folger system. She is a little larger than the steamer Empire State, having a carrying capacity of 1,200 passengers. She will be one of the American Line between Kingston & Montreal this season.

A Collingwood correspondent inquires of the Marine Record. "What steamer on the lakes has the deepest water bottom? Has the Centurion 72 ins. of a water bottom?" The Record replies: "The deepest water bottom on the lakes is found in the new steel steamer building for the Bessemer Steamship Co. at West Bay City, Mich., which is 72 ins. The tow barge, building for the same owners, has a water bottom of 5½ ft., all others range from 30 to 60 ins., the Centurion having only a 54 in. water bottom."

A Kingston, Ont. despatch says the red light at Snake Island is not in a satisfactory position & the Department of Marine will have it shifted from its present location. For some hundred feet east & southeast of Four Mile Light runs a bed of flat rock, not covered with sufficient water to allow heavily laden boats to pass over it. Another local improvement to be instituted by the Department is the buoying of the old ship channel.

The movement to establish a car ferry line between Port Stanley, Ont., & Conneaut Harbor, Ohio, has assumed definite shape. Docks will be constructed at Port Burwell, Ont. Hingston & Woods, of Buffalo, have ceived the contract for dredging. It is said this ferry line will enable the Michigan Central & Canadian Pacific, principally the Vanderbilt line, to compete with the Grand Trunk for the coal business. The Bessemer road is back of it, too.

The Tunisian is the name of the Allan Line's latest new boat. She is now upon the stocks, & is expected to be ready by April, 1899. She will be the largest vessel which has ever entered the port at Montreal. Registered tonnage 10,000 tons, length 510 ft., beam 59½ ft. She is to be a modern boat in every respect, with magnificent passenger accommodation, and enormous carrying capacity. Her speed will be about 16 knots. The other new Allan liner, the Castilian, will reach Montreal, on her 1st trip, about the middle of next July.

The C.P.R. steamer Kootenay, while making a landing at Robson, B.C., recently ran into a submerged rock in the middle of the river & stove a hole in her hull, which is believed to be 18 in. square. Had it not been for the fact that the steamer is provided with air-tight compartments it is certain that she would have sunk. The boat was moored safely & all on board landed without accident. There was about 4 ft. of water in the compartment in which the hole was located. It may be necessary to put the steamer on the dry dock for repairs.

On what is known as the Edmonton route to the Yukon, The Hudson's Bay Co. has a steamboat, the Athabasca, plying on the Athabasca River, between Athabasca Landing, about 100 miles north of Edmonton, Alberta, & the Grand Rapids, from which point freight has to be transferred in boats to Fort McMurray. From this point the steamboat Grahame runs to Fort Smith on the Slave River, where a transfer is made to the Wrigley, a screw steamer which goes across Great Slave Lake, & down the Mackenzie River to its mouth, a distance of about 1,300 miles. These steamboats are used for the business of the Hudson's Bay Co., & the Co. does not undertake to carry passengers & freight on them.

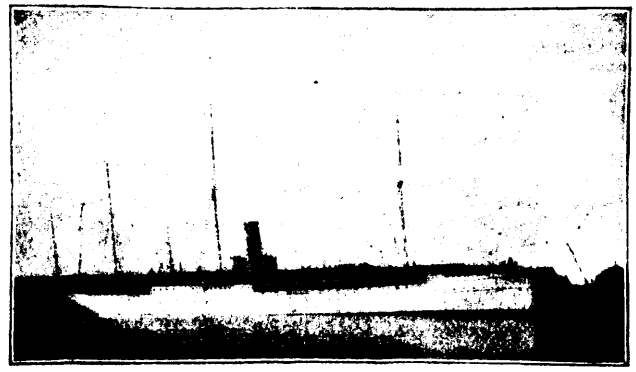
BY OCEAN AND RIVER

To the Great Yukon Gold Fields.

Never before in the history of mining was there such a mad rush to a new Eldorado as that setting in for Canada's northern gold fields. Never has existed a more alluring region for treasure-seekers, and never were there such facilities for spreading the news to every corner of the known world. Six months ago, people were appalled at the thought of thousands going to the Yukon. To-day, the invading army is numbered in the hundreds of thousands. A Wall Street financial firm recently ascertained from the mayors of all the cities and towns in the United States a rough estimate of the numbers in each intending to set out for the Yukon, and found that the total exodus from the United States alone is likely to exceed 200,000. Probably as many more treasure-seekers will leave other parts of the world; so that the northern gold fields have every prospect of a population of half a million within two years.

Heretofore, the vessels of the Canadian Pacific Navigation Co., of Victoria, B.C., sailing from that port and Vancouver, and those of the Pacific Coast Steamship Co., sailing from San Francisco and transferring passengers at Seattle, Wash., and Victoria to other steamships of the same line for northern points, have been ample to accommodate all passengers, but with the rush to the gold fields the northern waters have become fairly alive with boats, and countless numbers of vessels are under construction for the new traffic. At one time the C.P.N. Co.'s steamers made regular trips during the summer months from Victoria and Vancouver to Alert Bay, Ft. Rupert, River's Inlet, China Hat, Gardiner's Inlet, Port Essington, Ft. Simpson, Ft. Wrangel, Sitka and Juneau. Of late years their steamers went only to Ft. Simpson and intermediate points; but recently an extended service was announced to Queen Charlotte Islands on the first of each month, and steamers have gone on the Yukon route, leaving Victoria and Vancouver weekly for Wrangel, Juneau, Dyea and Skagway. The Pacific Coast Steamship Co.'s boats conducted excursions from San Francisco, Puget Sound ports, Vancouver and Victoria, to Sitka and northern points, transferring passengers to the north bound steamers at Seattle and Victoria. These were, practically, the only vessels of importance plying between Pacific Coast ports and the southern coast of Alaska.

But travellers bound for the interior of Alaska, for the great unknown country on each side of the Yukon River, generally entered the region by another and longer route. They took ship with one of the two big trading companies, the Alaska Commercial Co., or the North American Transportation and Trading Co., which practically controlled the trade of the vast interior. The boats of the trading companies ran between San Francisco, calling at Pacific ports, and St. Michael's, an island 70 miles north of the Yukon's mouth. St. Michael's was the headquarters of Arctic and Yukon trading. Here miners and traders were transferred from the ocean vessels to the shallow-draught river steamers, which carried them 1,370 miles up the Yukon to Forty-Mile Creek. The fame of the gold fields has transformed the face of the far northern seas. Where two trading companies and two navigation companies once monopolized all traffic, there are now hosts of vessels, ready on being prepared, to handle the greatly inreceased travel. Twenty-six vessels were scheduled to sail from Vancouver and Victoria for northern points between Feb. 10 and March 31, and this without including the craft leaving Seattle and San Francisco and not calling at Canadian ports. One ship-builder alone has orders for 14 new steamers for Yukon travel. Old vessels are being overhauled to join the fleet of northbound steamers. To keep account of the different transportation companies, preparing to handle the traffic, would be impossible, but brief mention of a few of the vessels booked for northern ports will give some idea of the activity among shipping circles.



THE C.P.R. CO'S S.S. ATHENIAN.

THE C.P.R. CO'S. STEAMSHIPS.

First in importance are the two steamships, the Tartar and the Athenian, recently purchased by the C.P.R. Co. from the Union Steamship Co., of London, Eng., which possesses the largest and finest fleet of any of the lines conducting a service from England to Cape Colony. Both the steamships have been employed in the trade for the South African gold and diamond fields.

The Tartar was built by Aitken & Mansel, of Glasgow. She is classed 100 A1 at Lloyd's, and is three-masted, schooner rigged. Her gross tonnage is 4,425; length, 376 ft.; breadth, 47 ft.; depth, 33.3 ft. She is fitted with triple expansion engines, by T. Richardson & Sons, of Hartlepool, the diameter of cylinders being 36, 58 and 94 ins., respectively, length of stroke 60 ins., and working pressure 160 lbs. She is fitted throughout with electric light, and has refrigerating plant and cold chamber for the storage of fruit, vegetables, milk, etc. From the commencement of her career in the South African mail service the Tartar has been a great favorite with passengers. She has a character for comfort and speed only exceeded by a very small number of the vessels employed in the South African trade.

The Athenian was also built by Aitken & Mansel, of Glasgow, and has always been regarded by passengers as a most comfortable vessel to travel by. She is a three-masted schooner, classed 100 A1 at Lloyd's, of 3,882 tons. Length, 365 ft.; breadth, 45½ ft.; depth 29 ft. In 1886, when the demand for higher speed in the Cape mail service was observed, the Union Steamship Co. put her in the hands of T. Richardson & Son, of West Hartlepool, who converted her engines from the compound system to the more modern and necessary triple expansion type, thereby materially increasing the speed of the ship at sea with little addition to the expense in coal.

As was the custom when the Athenian was built, the first-class accommodation was put aft, on the main deck, the cabins being extremely lofty. The dining saloon is large and airy, extending right across the ship, tastefully decorated and with a fine staircase leading from it on to the spar deck. On the upper, or spar deck are a few deck cabins, which are highly prized by passengers who are fortunate enough to secure their berths in them. The second-class accommodation is nearer the middle of the ship, just forward of the engines, and may fairly be described as comfortable and clean, with perfect ventilation. Smoking-rooms are provided for both first and second class passengers on the upper deck. The third class accommodation is in the fore part of the ship, four berth cabins being provided, each berth being fitted with patent wire mattresses in the place of the old wooden bunk. She is fitted with refrigerating apparatus and electric light.

THE C.P.R. CO'S S.S. TARTAR.

Both vessels have been thoroughly overhauled and refitted since they passed into the possession of the C.P.R. Co. Great interest was excited at Southampton on Feb. 5 by the departure

LOOKING DOWN STIKINE RIVER AT GLENORA.

of the Tartar for Vancouver, B.C., to call on the way at Teneriffe, Rio, Coronel and Callao. The C.P.R. was represented by T. Skinner, a member of the Board; Archer Baker, European Traffic Agent; A. Piers, Superintendent of Steamship Lines, and H. Moody, Deputy Secretary. Capt. Waite, former captain of the Tartar and now Shore Superintendent of the Union Line, was also present. Capt. Archibald, commander of the C.P.R. Co.'s H.M.S. Empress of China, and an old Orient Line captain, is in command of the Tartar, which has a small passenger list and a full cargo, including the C.P.R. Co.'s cable to be laid between Vancouver and Nanaimo. The Athenian sailed from Southampton on Feb. 12 for Vancouver, under command of Capt. Mowat, formerly of the C.P.R. Empress line, and both vessels are expected to be there early in April, when they will commence a service between Vancouver, Victoria and Fort Wrangel, one of them leaving the B.C. ports every Monday and Thursday. These steamers are far superior to any on the service, and as they are not likely to be beaten, they are sure to become highly popular.

OTHER OCEAN STEAMSHIPS.

The Washington and Alaska Steamship Co., in addition to its two steamers, recently chartered the S. S. Cleveland to run to Skagway and Dyea. The little steamer Augusta, 41 tons burden, left Seattle to engage in carrying trade between northern oceanports. The Mocking Bird hailed from the Sound and plies between Dyea and Skagway. There is the City of Nanaimo, carrying no freight but the personal effects of the passengers, for whom it had its accommodation increased, and which is now prepared to carry 200 passengers. The bark Richard III. is to be used by the same company for freighting exclusively. A company sent Capt. Chas. Hackett to London to select several steamers of some 1,200 tons register, with ample passenger accommodation, to sail direct from London for Victoria, Fort Wrangel and Dyea, and afterwards to ply between Victoria and Dyea. There is also the Barbara Boscowitz, formerly making Skeena its northern terminus. The Centennial Alaska Transportation Co. will operate steamers between Victoria and Vancouver and Wrangel, Skagway and Dyea, putting on this route the Centennial, a British built iron steamship of 2,075 tons, 450 passenger accommodation, and formerly of the P. and O. line. The Centennial will also make a special trip to St. Michael's in June. The Alaska Transportation and Development Co., of Chicago, plans a weekly service between Seattle and St. Michael's, having 6 steel steamships for the ocean and 6 light draught steamers for the river. The Maitland-Kersey Transportation Co. has already purchased the S. S. Monte Cristo for traffic between Wrangel and the mouth of the Stikine, where there is intricate navigation at certain stages of the tide, but over this the Monte Cristo can run with upwards of 100 passengers with comparative safety, as may be judged from the following dimensions:—Keel, 90 ft.; beam, 22 ft.; draft, 13 ins. Plans for a very fast twin-screw launch have been prepared. She will be 70 ft. long and will be used principally for the accommodation of the members of the company in addition to doing some towing on the Upper Stikine.

The sealing schooners, Oscar, Hattie and Fawn, and the S. S. Transfer, are being rigged out for Alaska freight and passenger business. Maitland Kersey, promoter of the Canadian Development Co., has arranged for the construction of 7 steamboats for the northern service. Another big steamer is in course of construction for Captains Fuller and Crane. This steamer is to have accommodation for 250 passengers. The Sound steamer, Utopia, has been taken off the Vancouver route and will run to Alaska ports. The Empire Transportation Co. will run 5 vessels, now being overhauled in Cramp's yard, the Ohio, the Indiana, the Illinois, the Pennsylvania and the Conemaugh. The Oceanic S. S. Co's. boat, Australia, will be withdrawn from Honolulu trade to run to Dyea, Skagway and St. Michael's. This list of vessels engaged in, or preparing for, Yukon traffic, gives some idea of the activity in Pacific coast shipping circles.

On the Stikine River.

Already Mackenzie and Mann are at work on the Stikine River—Teslin Lake route to the Yukon; and a volume of freight and passenger traffic, exceeding anything known in the history of transportation, is likely to pass through Wrangel and up the Stikine during the coming season.

TELEGRAPH CREEK, ON STIKINE RIVER.

Fort Wrangel, on an island off the mouth of the river, was the second settlement in southeastern Alaska after Sitka. It is 80 miles in from the ocean and its harbor is mountain-girt, and Wrangel, consequently, has colder winters and milder summers than any place along that coast. The first settlement was made by Admiral Baron Wrangel, who sent a subordinate officer from Sitka to build a stockade and to prevent the Hudson's Bay Co. maintaining trading-posts on the Stikine River. After much diplomatic controversy, Russia leased a 30-mile strip from Dixon Entrance to Yakutat to the H.B. Co., renewing the leases until the transfer of Russian America to the United States. The old fort was the scene of an exciting life among the Hudson's Bay officers and their men, owing to the hostility of surrounding natives. The discovery of the Cassiar mines and the influx of miners were the next important events in the history of Wrangel, and U.S. troops occupied the barracks from 1875 to 1877. After the abandonment of mining up the Stikine, a great quiet reigned in the little town. There was a saw-mill left. The traders' stores still remained and natives exposed their quaint curios in vain. For a second time in its history, Wrangel is revived by a mining boom and houses are now going up, stores are being erected and new wharves are every day pushing out over the waters of the harbor, as if in the twinkling of an eye. Hotels and lodging-houses, such as there are, are packed, and big structures, to accommodate the incoming crowds, are in course of erection.

BANK OF STIKINE RIVER, SHOWING HIGH WATER MARK.

After a sea voyage of more than 700 miles, passengers and freight are transhipped from the ocean to the river steamers. Here, the sea is described as frequently very boisterous. Then begins a trip up stream to Glenora and Telegraph Creek. The Stikine River is thus described by W. T. Jennings, C.E.: "The Stikine River and its branching head waters rise in the Cassiar Mountains between latitudes 56°20' and 59°20' N. and longitudes 128° and 131½° W. The main stream and its upper feeders, the Tanzilla, Tooya, and Tahltan, gradually converge and eventually unite in one grand watercourse within a distance of 16 miles, and from 10 to 26 miles above Telegraph Creek, which is at the extreme head of steamboat navigation and distant from the sea, at Fort Wrangel, 150 miles. The feeders (excepting the Tooya) and main river run as a rule in deep and more or less contracted valleys, with occasional canyon walls and generally steep lower slopes, while high undulating and mountainous country form the surroundings. From Telegraph Creek southward for some 30 miles, or to the inland border of the Coast Range, high gravel terraces or benches of a fairly regular level and outline are noticeable, especially on the east side of the valley, while near the water low benches are of more frequent occurrence, greater extent and few rocky projections on the river sides. About 116 miles from the sea the Clearwater River, a large tributary flowing through an open valley, enters from the northwest. Below the Clearwater and on to within 20 miles of the sea, the general course of the valley is south, and it is from 1 to 3 miles in width, but the river makes many bends and swings from side to side of it, and the bottom lands are more frequently divided by sloughs or by channels cut during freshet seasons through the silty and loose formation. The Klootchman and Little Canyons being almost exceptional points where there is only 1 channel, confined between rugged but receding rock walls, respectively 300 to 400 feet apart and ¼ of a mile in length at the former, and 100 to 150 feet apart for ⅜ of a mile at the latter. In both cases the direction of the river between the rocky shores is straight.

"Below the Little Canyon and on to the sea the flat lands increase in extent and the by-channels in number and volume. The Och-sa Kieen, Soud, Porcupine and Iskoot Rivers flow into the Stikine from the east at varying intervals, besides many small streams from glaciers and mountain clefts on both sides. The Iskoot River, which is the largest of the tributaries named, enters 35 miles from the sea, and 10 miles below it the Stikine changes direction to the west, passes out through the main range of mountains and on through an expansive valley to its wide delta-like mouth on the coast line, some 12 miles north of Wrangel and in latitude 56° 40' N. and long. 132° 20' W. The range of mountains cleft by this river valley is principally of granite rock and grand to look upon, as the peaks are lofty, rugged and irregular, and some five or six large and many small glaciers are yet to be seen, but, with few exceptions, they are "dead." The whole valley and slopes to the timber limit are clothed with cottonwood, spruce and alder trees, which decrease in size and quantity as the interior is reached. The Stikine River is usually navigable for powerful steamboats of suitable design to Glenora or Telegraph Creek, a distance of 150 miles, between the 1st of May and a date sometimes well on in October, dependent of course on the openness of the season and the amount of rain and snowfall. Its width varies from half a mile on the lower river to 500 feet above. The depth is generally good, and the channel is remarkably free from snags, sunken rocks or boulders. At Little and Klootchman Canyons, respectively 96 and 106 miles from the sea, during high water periods when many drift trees are running, it is with considerable risk that the passage through these contracted reaches are made, and delays are common, as drift-wood is liable to become foul of the rudders or wheels. The first 50 miles from the sea, or to the Great Glacier, is very good water with a moderate current not exceeding 3 miles per hour, while from this point upwards the channel becomes somwhat more tortuous and contracted, with an increasing general rate of current varying from 3 to 8 miles per hour; however, the exceptionally swift sections are few and usually not over a half mile in length. A powerful river steamer should be able to make the Little Canyon in one day's run from the mouth of the river, and the Glenora or Telegraph Creek on the second day. The sum of $5,000 could be advantageously spent in removing snags and boulders and in placing permanent cables for use in the heavy water, principally above the Little Canyon."

The trip from Wrangel to Glenora on the river steamers usually occupies about 36 hours, and Canadian territory is entered about 40 miles from the mouth of the river. A few months ago, Telegraph Creek was an aggregation of 40 or 50 cabins, with one store, but the process of transformation has been at work there, as well as in Wrangel.

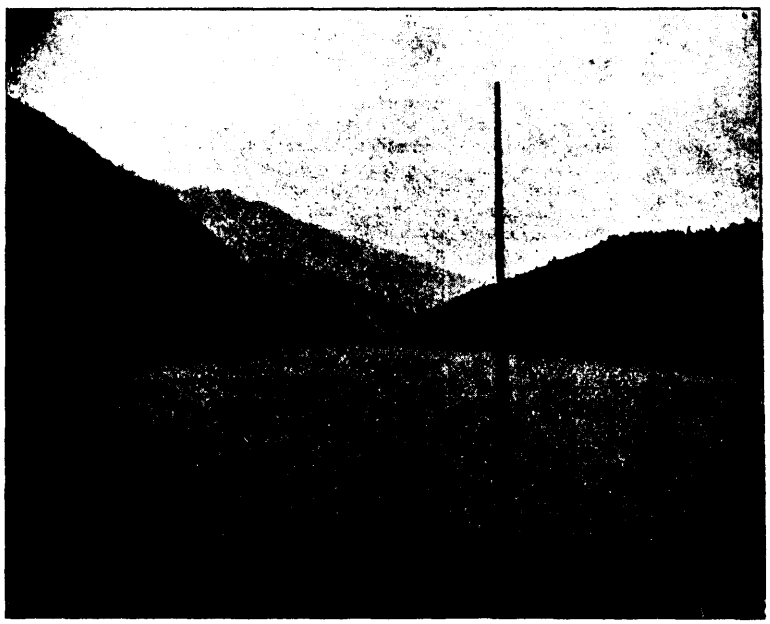
GLENORA RAPIDS, STIKINE RIVER, LOOKING UP.

Lying on the beach at Wrangel is the hull of the old river boat that plied the Stikine during the first boom. This moss-grown relic of former shipping is all that is left of the

Rudder Grange, which used to clear $135,000 each season. When its machinery gave out, the old stern-wheeler was transformed into a hotel. Then it became the rendezvous for wandering Chinamen, who worked the deserted placers. After the Rudder Grange fell to ruin, few boats except canoes were seen on the Stikine. Occasionally the H. B. Co.'s boat, the Caledonia, beat her way against the current, carrying supplies to trading-posts. The steamer made two trips from Port Simpson to the Stikine River and up to Telegraph Creek in 1896 and two in 1897; and her time, according to Mr. Ogilvie, from Fort Simpson to Wrangel, averaged 16 hours. The Caledonia draws, when loaded, 4 feet of water and only on the tidal flats at the mouth of the river was she bothered by shallow water. "At some points," reports Mr. Ogilvie, "short bends with a swift current required the aid of a line to surmount, but this was more to keep her in the channel than to help up. Sudden rises in the river also bring down lots of driftwood, which compel tying up until it abates. Her average time of ascent was about 37 hrs., exclusive of the time lost wooding up. Her average time of descent was about 14 hrs., including time wooding up and all stops. This boat is 150 ft. long, 24 ft. 4 in. beam, 2 engines, 1 cylinder 16 in. bore and 6 ft. stroke; steam pressure allowed 130 lbs; average used 90. Wheel makes ordinarily 24 revolutions a minute in dead water, but ascending swift current as many as 35 are made. Her average rate in dead water is about 10¼ miles an hour. Her rate up the Stikine is about 4 miles an hour and down about 12½." The Caledonia was recently sent to New Westminster to have her machinery transferred to a larger hull with lighter draught. The new hull is to be completed on April 15, when the Caledonia is to go north for the purpose of carrying Klondikers up the Stikine. The old hull is to be converted into a barge to carry fuel for the river steamers. Besides the Caledonia, the Alaskin, a flat-bottom, stern-wheel, old craft in the last stages of dilapidation, made a trip in October, 1897, taking up prospectors at a charge of $100 each, and taking ten days for the journey to and from Glenora.

Such has been the navigation of the Stikine in the past, but next summer will witness a marvellous transformation. The boats of the C.P.R., the C.P.N. and H. B. C., alone will make a large fleet on the river; and many other transportation companies are preparing to take a hand in the traffic.

The Dominion Government has decided to send immediately the Chief Engineer of Public Works, L. Coste, and the Chief Engineer of Marine, Lieut.-Col. Anderson, to the Stikine River and over the Canadian route to Dawson City, for the purpose of seeing what improvements are necessary to overcome obstructions to navigation. It is the intention to erect a wharf at Dawson.



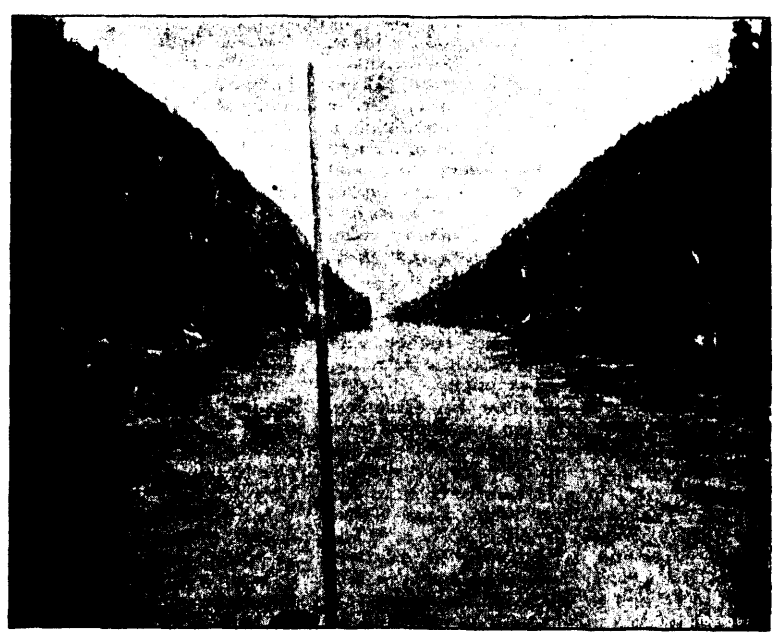
KLOOTCHMAN CANYON, STIKINE RIVER, LOOKING UP.

The C.P.R. Co. is having 10 light draft, flat-bottomed stern wheel steamers built for the Stikine River. Seven of these are being built of wood, 3 in Vancouver and 4 in Seattle, Wash. The other 3 which will have steel hulls, are being built in Toronto, one of them by the Polson Iron Works, The 3 being built in Toronto will have a length over all of 161 ft. 6 ins.; length, from stern to transom, 140 ft.; breadth moulded, 30 ft.; depth moulded keel plate to beam at side, 5 ft.; at centre, 5 ft., 7 1-2 ins. The engines will be 1 pair high pressure, non-condensing type, with cylinder 16 ins. bore, 72 ins. stroke. The boiler will be of the locomotive fire-box type, of ample capacity, and to pass Government inspection for 175 lbs. working pressure. The construction of the hull throughout will be of open hearth steel, except the bottom, which is to be B.C. fir to the turn of the bilge. There will be two fore and aft water-tight bulkheads, and several cross water-tight bulkheads athwart ships. The decks and deck houses will be of wood, and, with the bottom, will be put in by the C. P. R. Co. at the Pacific Coast, where the boats are to be completed by the end of April. The boats will have a draught of 18 ins. when light, with a capacity for 100 tons of freight and 200 passengers each, and will have a speed of 15 miles an hour in quiet waters. It is expected that the hulls and machinery will be sent from Toronto during this month to Vancouver, where they will be put together. The use of steel for the hulls will render the boats much lighter than if built of wood. The seven wooden ones being built at the coast will have similar dimensions.

The Hudson's Bay Co. are having two steamboats built for the Stikine. They will be 140 ft. long and 32 wide, capable of carrying about 100 passengers and 80 to 100 tons of freight, and will be lit by electricity. The B. C. Iron Works, Vancouver, are manufacturing the machinery, and J. H. Moir, New Westminster, is building the boats.

Until July, three of Mackenzie and Mann's boats will run on the Stikine, but after that they will be transferred via the Yukon to Teslin Lake. Maitland Kersey's Co. is also preparing to handle the river traffic. J. Todd, who has had 20 years' experience navigating the Missouri, and Messrs. Hagerty and McCaskey, recently went to Victoria to supervise the building of 3 steamboats for the Stikine route. The steamers are to be 156 ft. over all and 33 ft. beam. The boilers and machinery are being constructed by Jas. Reese & Sons, of Pittsburg. Four other stern-wheel steamers are being constructed in Vancouver for another company which is competing for a share of Stikine transportation. W. J. Stephens, of Victoria, is building 3 stern-wheel steamers for a B. C. syndicate and a twin-screw boat for a Tacoma firm. The former are to be used on Lake Bennett, and the latter on Teslin Lake. F. M. Rattenbury and W. E. Dowler, of Victoria, also have under supervision the construction of river steamers for an English syndicate. The Stikine Navigation Co. was recently incorporated to engage in the northern transportation business.

From Telegraph Creek to Teslin Lake, pack trains will have to be used until Mackenzie and Mann have completed the railway across country a distance of some 130 or 140 miles. Sections of the line will be used as soon as completed. The trail from Telegraph Creek to Teslin Lake is through an undulating country, partly covered with scrubby timber. The road built by the Government follows a comparatively flat country, the swampy land being corduroyed. The railway contractors are to construct and to have ready during this month a good road from the mouth of the Stikine to Lake Teslin, with suitable stopping places every 25 miles.



LITTLE CANYON, STIKINE RIVER, LOOKING UP.

Once at Teslin Lake, all will be compara-

tively plain sailing. Another fleet of stern-wheel steamers will be waiting, and in three days—the time given by a surveyor, who has passed a long service in that country—a passenger should arrive at Dawson City. On Lake Teslin, which is from 2 to 5 miles wide and 80 miles long, a steamer is now completed, and arrangements are being made for the placing of many others on the lake prior to or on opening of navigation. Lumber is plentiful around the lake for the construction of boats and batteaux by those who wish to prospect en route, and last season a number of craft, each capable of carrying three or four passengers and five tons of freight safely to Dawson City, were easily constructed in two days.

There is clear navigation from the head of Lake Teslin to Dawson City, with but one rapids—that of Five Fingers—along the entire distance, and this, with care, is reported to be usually navigable on the northern or right-hand channel. Out of Lake Teslin flows the Hootalinqua or Teslin River, which, after being joined by the Big Salmon River, is known as the Lewis, which is followed to Fort Selkirk, where, with the Pelly, it forms the Yukon, of which it is the principal source.

It is said that by the arrangements which are being made on the Teslin route the trip from Vancouver to Dawson City will be made in a fortnight during the early part of the season; and it is believed that with the railway in operation this time will be cut down to about a week.

By the Yukon River.

"Starting from Victoria, or Vancouver," says Wm. Ogilvie, of the Yukon River route to the gold fields, "we make our way by an ocean steamer to St. Michael's, about 2,700 miles from Victoria or Vancouver. The steamer approaches St. Michael's a greater or less distance as she draws more or less water. A boat drawing 12 ft. or less may come within a mile of it—one of greater draught has to anchor further out. The cargo is discharged on lighters, towed by small steamers to the warehouses of the several companies. From here up to Dawson or other points on the Yukon, passage is made on stern-wheel steamers, of which there are at present 7 or 8. Four belong to one of the trading companies, three to the other, and one or two to other parties. The time taken in ascending the river from St. Michael's to Dawson, supposing we have fair weather continuously, is from 14 to 18 days. The steamer has to fight its way up this long stream against a stiff current, with, in low water, shallow places at several points: also there is much time lost procuring wood. Much of the fuel at present used is cut by Indians, and piled up along the banks. For the first 500 miles upwards the fuel consists entirely of driftwood, as there is no timber in the vicinity of the river large enough to be utilized for that purpose. Above this point timber is plentiful, but green. The boat is tied up to the beach, all hands available sent ashore, trees cut down, generally carried on board in long lengths, and sawn into proper lengths for furnace use on board. Much of this is entirely green, as what little dry wood was scattered along the bank of the river has been pretty well used up. In the future much delay will be caused to steamers on this account, as the wood gets further and further from the river. Heretofore, there were only 3 or 4 steamers plying on the river. Next summer there will probably be 25 or 30. These will use up in a single trip all the wood cut, as the steamers now on the river use from 16 or 18 cords a day to 24 or 30.

"Through the kindness of Capt. Kennedy of the Alaska Commercial Co.'s steamer Alice, I am able to give her dimensions and the log of one of her trips. Capt. Barr of the North American Transportation and Trading Co. kindly gave me from his logs the distances from point to point along the river as he deduced them from the travelling rate of the steamer. I am inclined to think his distances are overestimated and that a survey of the river will prove it shorter than he puts it. Dimensions of steamer Alice: Length 165 ft.; beam 32 ft.; depth 8 ft. Compound tandem engines, but no condenser, high pressure cylinder, 14 in. bore, low pressure, 22 in. Length of stroke 6 ft. Steam pressure 150 to 180 lbs., consumption of wood per day 16 to 18 cords. She can carry about 500 tons, but when so loaded draws too much water for the river (about 5 ½ ft.). In 1896 she made a trip from St. Michael's to Fortymile as follows; the distances are by Captain Barr: St. Michael's to mouth of Yukon, 72 miles, 9 hrs. 40 min., mouth of Yukon to Nulato, 576 miles, 81 hrs. 30 min., Nulato to mouth of Tanana, 249 miles, 36 hrs. 30 min., mouth of Tanana to Fort Yukon, 456 miles, 60 hrs. 25 min., Fort Yukon to Circle City, 88 miles, 21 hrs. 10 min., Circle City to Fortymile, 156 miles, 47 hrs. 40 min., Fortymile to Sixtymile, 97 miles, 19 hrs. 15 min. This makes the total running time from St. Michael's to Fortymile 255 hrs. and 25 min., or ten days, 15 hrs. 25 min., the distance being 1,597 miles. In addition she must have lost 4 to 6 hrs. at least per day cutting wood and loading it.

RAPIDS ABOVE SHAKES, STIKINE RIVER, LOOKING DOWN.

"After we get up the river some 1,300 miles we strike what is known as the Yukon Flats. These flats were no doubt the site of a lake ages ago, now filled up with numberless islands and channels, most of which are too shallow, crooked and narrow for steamboat passage. The sand and mud drifts about in them, changing the course of the steamboat channel, and every year appears to be getting more and more difficult of navigation. In the summer of 1895 water remained high until well into September; the result was that one of the Alaska Commercial Co.'s steamers, the Arctic, made 5 passages from the mouth of the river to Fortymile. This is the record season, it has never been repeated since. The fastest round trip on record, from and to St. Michael's, was made by the same Co.'s steamboat Alice, in 1897. It took less than 22 days. As a rule, the trip occupies a month. We may generally count on several days detention at St Michael's. There high winds render it impossible for the river steamers to make their way over Behring Sea to the mouth of the river. The same detention may be caused on the return trip, and the steamer may have to lie in the mouth of the river for days. Then, again, the channel at the mouth is shallow and crooked, and as it is only open for 3 or 3½ months in the year it is impossible to mark it, and even if we could do so it is not permanent, for the ice drifting about in the shallow water in Behring Sea often ploughs up the mud in ridges, making barriers across places which were heretofore good, deep water. In 1896 a boat ran on to a barrier near the mouth of the river and lay there for 14 days before the wind and tides combined raised the water high enough to enable her to float. To enter the country by this route we need not contemplate arrival at Dawson much earlier than the middle of July. The ice in the river breaks about the middle of May, but Behring Sea, as a rule, is not open until the last 10 days of June—indeed, in 1896 it was not until July 7 that the ocean steamer could approach St. Michael's."

St. Michael's is on an island in Norton Sound, 70 miles north of the Yukon's mouth, and is the commercial capital for the Yukon and Arctic regions. Besides the trading warehouses and officers' houses, there are a Swedish mission and school and some other church mission-houses in St. Michael's. Since the rush north ward set in, St. Michael's has expanded greatly, the new structures consisting chiefly of lodging-houses, hotels and saloons.

Instead of half-a-dozen steamers plying the Yukon, as heretofore, there is likely to be a fleet of 50 steamers on the river this summer. The Alaska Commercial Co. is now having constructed 14 large river steamers and a large number of barges to be used in the navigation of the Yukon between St. Michael's and Dawson City. Maitland Kersey states that steamers are now being built in England for use on the Yukon River by his company. These steamers will be shipped in sections and put together in B.C. The C.P.N. Co. has river steamers to connect with its ocean vessels. A few weeks ago, a stern-wheel steamer, named the Research, destined for the Yukon, was launched in London, England. She draws 2 ft. 6 in., has a speed of 10 knots, and carries stores for 15 months. Her 22 passengers are to live in her commodious deck house after reaching Dawson City.

Anticipating the great river traffic, the U.S. Government is sending Prof. Pritchett, of the Coast & Geoditic Survey, to Alaska, to make an examination of the delta of the Yukon, for the purpose of locating & marking the deep-water entrance to the river. For this Congress has appropriated $10,000, & the 30 men composing the party leave San Francisco for the north in April.

It is quite an easy thing to build a boat, but, according to President Turner, of the Alaska Trading & Mining Co., a boat for the Yukon is not just the same sort of craft that would do for other service. The Weare, the largest Yukon river steamer, draws 4

ft. of water, & stuck last season. Flat-bottom boats, 165 ft. long & 36 1-2 wide, drawing 21 ins. when loaded, & made of wood, are supposed to be the most practicable for the river. A boat of this kind will carry 200 passengers & 300 tons of freight. It can be placed on land in the winter & used for an hotel. The bare hull, covered so that it will float with either side up, is towed by an ocean steamer from Seattle to St. Michael's, & the machinery is shipped as freight. One ocean steamer can tow 2 of these hulls. The expenses of running the boats are high. River captains on the Yukon command a salary of $250 a month, & they are paid that the year round on contract, although the season of navigation commences about June 20 & closes about October 15 or 20. Pursers are paid $200 a month on a year's contract, & pilots get $175 a month. A river steamer can make only 2 round trips from St. Michael's to Dawson City in one open season. Many have tried to make 3, but were generally stuck in the ice on the latter half of the trip. Mr. Turner does not see how the thousands of people who will be carried to St. Michael's in the ocean steamers will find their passage up the river to Dawson City. One ocean steamer carries 500 to 800 passengers, while a river steamer on the Yukon can, as a rule, carry only some 200.

The Sintram is being sent north from San Francisco to St. Michael's, the first of several new steamers for the Yukon. The old whaler, Lew Williams, has also joined the river fleet. Capt. Armstrong & Mr. Barber are putting on the Yukon a boat of about 126 tons. Having sold their old steamer to the eager miners, the Jesuit Fathers of San Francisco are having a new steamer, 92 by 22 ft., built to run between their Yukon mission stations.

Moran Bros. Co., Seattle, Wash., write THE RAILWAY & SHIPPING WORLD that in addition to the torpedo boat Rowan, which is nearing completion for the U. S. Navy, it has under construction in its yards at Seattle 17 river steamers & 25 barges. Of the steamers 14 are being built for the Yukon Co., the other 3 being for the Seattle & Yukon Steamship Co. The steamers for the Yukon Co. consist of 6 vessels 260 ft. long & 50 ft. beam, six 175 ft. long & 35 ft. beam, & two 100 ft. long & 22 ft. beam, all of the stern-wheel light draught type. The first 12 are designed & fully equipped for passenger & freight service. They are to have 3 decks, with the best cabin accommodations. Two steamers building for the Yukon Co. are tow boats for river & coast service. The river barges are also being built for the Yukon Co. They are to be 30 by 120 ft. with flat bottom. They are intended to carry a deck cargo only & are to have a freight house on deck. These steamers & barges are for service on the Yukon River, & are to be delivered at the time navigation opens on the river the coming season. Their approximate value is $1,000,000. The vessels under construction for the Seattle & Yukon Steamship Co. consist of 2 steamers designed & equipped for passenger & freight service, 190 ft. long & 32 ft. beam, & a tow boat 100 ft. long & 22 ft. beam, all of the stern-wheel, light draught type. The approximate value of these is $100,000 & they are also to be in service during the coming season on the Yukon River. The machinery for all these steamers was designed by Moran Bros. Co. & is being built by it in its shops at Seattle. Each steamer is to be equipped with a complete electric light plant. Moran Bros. Co. also operates a ship yard at Dutch Harbor, Unalaska, where it has under construction 2 passenger river steamers, 190 ft. long & 32 ft. beam, & 1 river tow boat 120 ft. long & 26 ft. beam, all of the stern-wheel type. A fourth steamer is being constructed there by it, which is 140 ft. long & 28 ft. beam. The hull for this vessel is of steel & was purchased in Toledo, Ohio, & shipped west in sections. It is being reconstructed with new house & cabin, fully equipped for passenger & freight service. Several river barges are also being constructed at this yard. All the vessels being built at Dutch Harbor are to be delivered in the early spring to the North American Transportation & Trading Co., for whom Moran Bros. Co. has already constructed several steamers now doing satisfactory service.

The Polson Iron Works, Toronto, is building for the Yukon & Klondike Pioneers Co., for the Stewart River, a tributary of the Yukon, a flat-bottomed, stern-wheel steamer, 58 ft. long & 10 ft. beam, which when light will draw about 12 ins. of water & will have a speed of 12 miles an hour.

Through the courtesy of Passenger Traffic Manager McNicoll of the C.P.R., we are able to give at the back of this issue a copy of his Co.'s excellent map showing its routes to the Yukon gold fields, which will be found valuable to refer to while reading this article.

Richelieu & Ontario Navigation Co.

Senator Forget, the President, presided at the annual meeting in Montreal, February 6. The report stated the gross receipts for the year were $688,026.09, operating expenses $552,950.94, fixed charges $26,945.09, & the net profit $108,130.06. Two semi-annual dividends of 3 per cent. each amounting together to $81,000 were paid, leaving $27,130.06 to be carried to surplus.

Notwithstanding some unfavorable circumstances, such as cold weather during most of the spring & part of the summer, & the laying up of one of the Western steamers in the middle of the season on account of smallpox, the earnings show a gratifying increase over the previous year both in the gross & net results.

Carrying out the intention of this & previous boards of paying off the Co.'s floating liabilities, a sale of $150,000 of stock was made at par on Nov. 2 last. As a result of this sale & of the general operations for the year, the statement shows $15,280.17 cash on hand, as against a floating debt of $188,989.34 on Dec. 31, 1896.

In conformity with the deed of trust, 38 bonds of £100 sterling each, amounting to $18,493.32 have been withdrawn & cancelled, making a total to date of $36,013.32. The Co.'s hotel at Tadousac has continued to show satisfactory results, & in consequence of its inability to accommodate the visitors offering, an enlargement of the building was made during last autumn by which its capacity has been increased over one-half.

With the view of meeting the want for larger steamers on the line between Toronto & Montreal, the directors, in Nov. last, entered into a contract for a modern first-class passenger steamer, 277 feet in length, to be ready for the ensuing season, & at the same time made arrangements for the necessary capital for her construction by the sale of 2,400 shares of stock at par. It is the intention to build another steamer of similar class for the same route to be ready for the season of 1899.

Following is the financial statement :—

ASSETS.

Steamers, real estate, buildings, wharves, &c	$2,165,709.69	
Coal, stores, provisions, &c	82,306.82	
Accounts receivable	60,785.42	
Cash in bank	15,280.17	
		$2,324,082.10

LIABILITIES.

Capital stock			$1,500,000.00
Bonds, 5 p.c. sterling $571,833.33			
Less cancelled	$36,013.32		
In treasury	12,653.34	48,666.66	523,166.67
Accounts payable			68,142.99
Unclaimed dividends			783.00
Accrued interest on bonds			8,930.32
Surplus			223,059.12
			$2,324,082.10

INCOME ACCOUNT.

ASSETS.

Dividend 6 per cent. Paid May 2, 1897	$40,500.00	
Dividend 6 per cent. Paid Nov. 2, 1897	40,500.00	
		$81,000.00
Carried to surplus December 31, 1897		27,130.06
		$108,130.06

LIABILITIES.

Net income over & above expenses, fixed charges & interest, for year ended December 31, 1897	$108,130.06

The report having been unanimously adopted, the following were elected directors: Hon. L. J. Forget, W. Wainwright, F. C. Henshaw, Hector MacKenzie, E. B. Garneau, C. O. Paradis, Jas. Swift. Jos. Lewis, J. K. Osborne, R. Forget & W. Hanson. This is the same board as last year with the addition of J. K. Osborne, of Toronto. At a directors' meeting held afterwards, Senator Forget was re-elected President, & W. Wainwright, Vice-President.

THE NEW STEAMBOAT.

Following is a description of the steamboat Toronto, now being built, and which is to be completed this season to run between Toronto and Prescott :—Length over all, 277 ft. ; breadth of hull, 36 ft. ; breadth over guards, 62 ft. ; depth of hull, 14 ft. ; draft of water, 8 ft. 6 in.

The hull will be of open hearth steel with 4 water-tight bulk-heads. It will have considerable dead rise on the bottom with sharp lines forward and aft, permitting easy propulsion. The general shape of the hull under water is based on experience gained with the Niagara Navigation Co's steamboat Corona, of Toronto, which is considered a decided success, both in regard to economy and speed.

The engines will be inclined triple expansion with 3 cranks and 3 cylinders, respectively 28, 40 and 74 in. in diameter and 6 ft. stroke, each built for a working pressure of 175 lbs. of steam per square in., and for a speed up to 40 revolutions, with feathering paddle wheels 22 ft. in diameter, with curved steel buckets.

The boilers will be 4 in number, of Scotch pattern, 11 ft. in diameter and 11 ft. 6 in. long. Each boiler will have 2 furnaces of Adamson type, 40 in. in diameter, fitted with the Howden system of hot draft.

The general outfit, including anchors, chains, windlasses, steam capstans, fire & life-saving apparatus, water-tanks for trimming purposes, steam steering gear, steam heating, waterworks & artificial ventilation plant, & electric light plant for 700 lights, will be of the latest & most approved designs.

The passenger accommodation will be of the same general description & ornamentation as that of the steamers of the New York & Fall River Line, & more especially that of the steamboat Plymouth, with 2 tiers of staterooms in the upper saloon & a capacity for sleeping 400 passengers, in addition to crew, & with the dining-room on the highest deck forward.

The average time-table speed will be 17 miles an hour, with a capacity for 20 miles when required, which will permit of more convenient hours of sailing being arranged for than at present.

J. F. Wardner, the founder of Wardner in East Kootenay, B.C., will probably engage in the Yukon transportation business.

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
Jas. W. Pyke & Co.....Montreal.
Rhodes, Curry & Co.....Amherst, N.S.

Babbit
Rice Lewis & Son.....Toronto.

Blankets & Bedding
The Hudson's Bay Company.....

Block & Tackle
Dominion Wire Rope Co. .....Montreal.
Rice Lewis & Son.....Toronto.

Boat Fittings & Hardware
Rice Lewis & Son.....Toronto.

Boiler Covering
Mica Boiler Covering Co.....Montreal.

Boilers
Polson Iron Works.....Toronto.

Boiler Tubes
Jas. W. Pyke & Co.....Montreal.

Bolsters
Simplex Railway Appliance Co.....Montreal.

Bolts
Rice Lewis & Son.....Toronto.

Brake Beams
Simplex Railway Appliance Co.....Montreal.

Brass Castings
St. Thomas Brass Co.....St. Thomas, Ont.

Bridge Numbers
Acton Burrows Co .....Toronto.

Bridges
Dominion Bridge Co. .....Montreal.

Buoy Lighting
Safety Car Heating and Lighting Co., New York

Cables, Electric
E. F. Phillips Electrical Works, Ltd., Montreal.
The Wire and Cable Co.....Montreal.

Cables, Feeder
E. F. Phillips Electrical Works, Ltd., Montreal.

Car Heating
Safety Car Heating and Lighting Co., New York

Car Jacks
James Cooper.....Montreal.
W. H. C. Mussen & Co.....Montreal.

Car Lighting
Safety Car Heating and Lighting Co., New York

Carpets
The Hudson's Bay Company.....

Cars
Rhodes, Curry & Co.....Amherst, N.S.

Car Wheels
Jas. W. Pyke & Co.....Montreal.
Rhodes, Curry & Co.....Amherst, N.S

Castings
Canada Switch and Spring Co.. .....Montreal.
Rhodes, Curry & Co.....Amherst, N.S.

Cement Machinery
Jas. W. Pyke & Co.....Montreal.

Chains
Rice Lewis & Son.....Toronto.

Concrete Mixers
W. H. C. Mussen & Co..... ....Montreal.

Contractors' Plant
M. Beatty & Sons.....Welland, Ont.
James Cooper.....Montreal.

Cross Arms, Top Pins & Side Blocks
The Firstbrook Box Co..... .....Toronto.

Curtains
The Hudson's Bay Company.....

Cuts
Acton Burrows Co .....Toronto.

Ditchers
M. Beatty & Sons.....Welland, Ont.

Derricks
M. Beatty & Sons.....Welland, Ont.
James Cooper.....Montreal.

Door Signs
Acton Burrows Co .....Toronto.

Dredges
M. Beatty & Sons.....Welland, Ont.

Dry Goods
The Hudson's Bay Company.....

Electric Car Route Signs
Acton Burrows Co .....Toronto.

Electric Cranes
Dominion Bridge Co.....Montreal
W. H. C. Mussen & 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.

Expanded Metal
Expanded Metal and Fireproofing Co..Toronto.

Express Office Signs
Acton Burrows Co .....Toronto.

Fencing
Page Wire Fence Co.....Walkerville, Ont.

Fireproofing
Expanded Metal and Fireproofing Co..Toronto.

Flags
Rice Lewis & Son.....Toronto.
The Hudson's Bay Company.....

Foghorns
Rice Lewis & Son.....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.....

Hardware
Rice Lewis & Son.....Toronto.
The Hudson's Bay Company.....

Headlights
N. L. Piper Railway Supply Co.....Toronto.

Hose
Gutta Percha and Rubber Mfg. Co. of Toronto.
Rice Lewis & Son.....Toronto.

Illustrations
Acton Burrows Co .....Toronto.

Interlocking Plants
Canada Switch and Spring Co..... ..Montreal.

Iron
Rice Lewis & Son. .....Toronto.

Iron Signs
Acton Burrows Co .....Toronto.

Japans
McCaskill, Dougall & Co.....Montreal.

Journal Bearings
Jas. W. Pyke & Co..... . Montreal.
St. Thomas Brass Co.....St. Thomas, Ont.

Lager Beer, &c.
E. L. Drewry.....Winnipeg.

Lamps & Lanterns
The Hudson's Bay Company.....
Rice Lewis & Son.....Toronto.
The Hiram L. Piper Co.....Montreal.
N. L. Piper Railway Supply Co.....Toronto.

Launches
Polson Iron Works.....Toronto.

Life Insurance
Independent Order of Foresters.....Toronto.
Travelers' Insurance Co..... .....Montreal.

Lights, Contractors and Wrecking
James Cooper.....Montreal.
W. H. C. Mussen & Co.....Montreal.

Linoleum and Floor Coverings
The Hudson's Bay Company.....

Locomotives (Compressed Air)
American Locomotive Co.....New York, N.Y.
Baldwin Locomotive Works..Philadelphia, Pa.

Locomotives (Electric)
American Locomotive Co.....New York, N.Y.
Baldwin Locomotive Works..Philadelphia, Pa.

Locomotives (Steam)
American Locomotive Co.....New York, N.Y.
Baldwin Locomotive Works...Philadelphia, Pa.
Canadian Locomotive Co.....Kingston, Ont.
James Cooper.....Montreal.

Locomotives (Rack)
American Locomotive Co.....New York, N.Y.
Baldwin Locomotive Works..Philadelphia, Pa.

Machine Tools
John Bertram & Sons Co.....Dundas, Ont.

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-Signal Oil Co., Franklin, Pa., & Toronto.
The Queen City Oil Company.....Toronto.

Office Signs
Acton Burrows Co .....Toronto.

Packing
Gutta Percha and Rubber Mfg. Co....Toronto.

Pinch Bars
The Hiram L. Piper Co.....Montreal.

Pipe Covering
Mica Boiler Covering Co.....Montreal.

Plushes
The Hudson's Bay Company.....

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.
Drummond, McCall & Co.....Montreal.
J. J. Gartshore.....Toronto.
Rice Lewis & Son.....Toronto.

Rails (for relaying)
James Cooper.....Montreal.
J. J. Gartshore.....Toronto.

Roof Trusses
Dominion Bridge Co.....Montreal.

Rope
Rice Lewis & Son.....Toronto.
The Hudson's Bay Company.....

Rubber Goods
Gutta Percha and Rubber Mfg. Co. of Toronto.

Semaphore Arms
Acton Burrows Co .....Toronto.

Semaphores
The Hiram L. Piper Co..... .....Montreal.

Shafting
Rice Lewis & Son..... .Toronto.

Shipbuilders' Tools & Supplies
Rice Lewis & Son.....Toronto.

Ship Lamps
The Hiram L. Piper Co..... ....Montreal.

Ships
Polson Iron Works .....Toronto.

Shovels
James Cooper..... .Montreal.
The Hudson's Bay Company.....
Rice Lewis & Son..... .....Toronto.

Side Bearings
Simplex Railway Appliance Co.....Montreal.

Signal House Numbers
Acton Burrows Co .....Toronto.

Signals
The Hiram L. Piper Co.....Montreal.
N. L. Piper Railway Supply Co.....Toronto.

Signs
Acton Burrows Co .....Toronto.

Snow Ploughs
Rhodes, Curry & Co.....Amherst, N.S.

Spikes
Rice Lewis & Son.....Toronto.

Springs
Canada Switch and Spring Co.... ....Montreal.

Station Name Signs
Acton Burrows Co .....Toronto.

Steamboats
Polson Iron Works..... .....Toronto.

Steamboat Signs
Acton Burrows Co .....Toronto.

Steam Couplers
Safety Car Heating and Lighting Co., New York

Steam Shovels
M. Beatty & Sons.....Welland, Ont.
James Cooper..... ....Montreal.
W. H. C. Mussen & Co.....Montreal.

Steel
James Cooper.....Montreal.
Rice Lewis & Son.....Toronto.

(Continued on preceding page.)

THE BEST FLOUR

HIGHEST AWARDS AT HOME AND ABROAD

WINNIPEG & PARIS EXHIBITIONS

THE FLOUR MANUFACTURED BY THE HUDSON'S BAY COMPANY HAS RECEIVED THE GRAND PRIZE AT THE PARIS EXHIBITION AND THE HIGHEST AWARDS AT THE WINNIPEG INDUSTRIAL EXHIBITION

ALL THE FLOUR MADE BY THE COMPANY IS FROM SPECIALLY SELECTED WHEAT

HUDSON'S BAY COMPANY