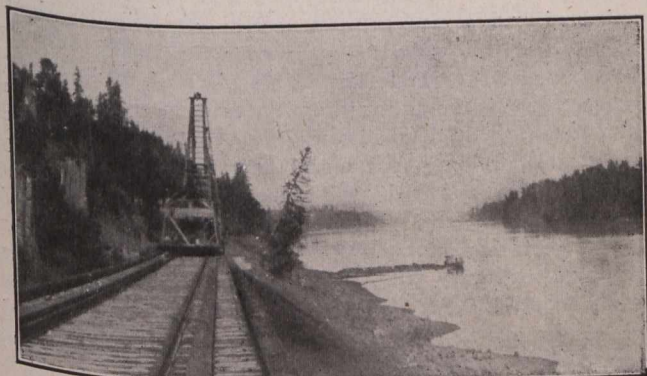


of the wharf were of fir, as were also protection clusters driven at the wharf ends and the mooring piles, since, in a matter of cross bending fir has nearly three times the strength of cedar.

Next, let us consider the timber in the wharf. Douglas fir was used entirely, being the cheapest, and also the best, timber in British Columbia. This timber retails at from \$13 to \$15 per M., according to the sizes. It was supplied by the Canadian Western Lumber Co., whose immense mills by the north bank of the Fraser River, almost directly opposite Port Mann, are probably the largest in the world. The caps are 14-in. by 14-in. timber, a section of which, although not the most economical for the given loading, was considered best, as it gave added stiffness to the bents and provided a better joint. The caps were run at right angles to the face of the wharf. The splice indicated on the accompanying elevation was a 12-in. step joint, which, with the head of the pile having a minimum diameter of 18 in., provided for at least a 3-in. bearing of the cap outside the splice. To obtain this 3-in. bearing, however, occasioned some difficulty with the contractor, so that a butt joint was substituted, the ends of the caps being fastened down with a 24-in. drift bolt, driven $4\frac{1}{2}$ inches from the end of the cap. The position of the shorter cap, as shown on the elevation, was varied, so that the break in the cap joints of alternate bents did not fall opposite to one another.

The joists were of dimensions 4 in. by 10 in., being staggered and overlapping one foot. They were toe-spiked to the cap with 6 in. wire spikes. The flooring was 3 in. in thickness. It should have been specified as dressed to 3 in. thickness, but this was not done, and in consequence the first portion of the floor laid was somewhat rough. The wharf floor was faced with two pieces of 12 in. by 12 in. waling drift bolted to one another, as shown in the elevation, and drifted in turn to the caps. This waling was perfectly lined, and has given the face of the wharf a very finished appearance, and has also done good service in operating the wharf to date.

Outside of each of the outer bearing piles were driven springing piles of fir. These springing piles were driven rather farther from the bearing piles than is shown on the plan, being distant 3 ft. centres at the river bed, and butted against the 14-in. by 14-in. cap with twelve inches clear be-



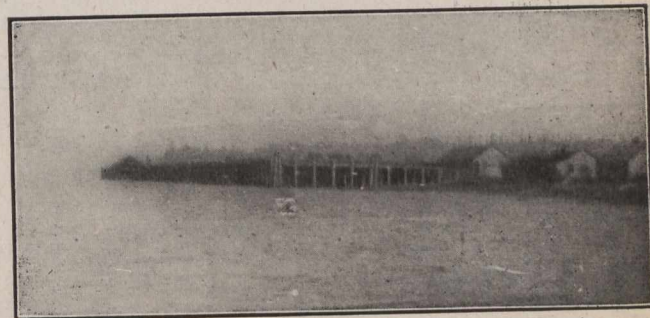
Fraser River, from C.N.P. Railway Track.

tween the piles at the top. Their object is, of course, to take the shock of a vessel coming to her mooring alongside the wharf. These springing piles were cut off on a bevel, being flush with the upper 12-in. by 12-in. wale on the inside, and sloping outward at an inclination of 30 to the horizontal. This uniformity of slope of these outer piles considerably enhances the appearance of the wharf. An 8-in. by 12-in. spacing wale was made fast along the entire face of the wharf, between these springing piles.

Mooring piles were driven as shown on the plan. They were braced to the four nearest bearing piles by means of 8-in. by 8-in. struts.

On the freight wharf two runways were constructed according to the details shown on the plan. Sliding stringers support the removal planks of the flooring over the runway, so that when not in use the runways may be covered in. These sliding stringers operate on rollers suspended from the joists of the adjoining portion of the wharf. They may be handled by one man quite readily.

Three four-pile clusters were driven at each end of the wharf, the first at the outside corners as a protection to that portion of the structure, and the two inner clusters in a line,



Port Mann Wharf, from the River.

making an angle of 45 with the face of the wharf. These clusters support glance booms, which were placed at the wharf ends to fend off ice in winter, and floating trees, &c., at freshet time. Owing to the tide causing a change in the direction of the current during the winter season, the placing of a glance boom at the west end of the wharf was also necessitated. The cluster piles were bound together near the top with $\frac{3}{4}$ -inch steel cable.

Below is given the bill of material for the entire wharf.

**CANADIAN NORTHERN PACIFIC RAILWAY.
Bill of Material, Port Mann Wharf.
Piling.**

Bearing Piles 12 in. up—			
226	piles,	45 ft. long.....	10170 lin. ft.
484	"	55 "	26620 " "
122	"	60 "	7320 " "
77	"	65 "	5005 " "
90	"	70 "	6300 " "
60	"	75 "	4500 " "
102	"	80 "	8160 " "
59	"	85 "	5015 " "
17	"	90 "	1530 " "
			74620 lin. ft.

1237

Springing Piles 12 in. up—			
8	piles,	35 ft. long.....	280 lin. ft.
1	"	45 "	45 " "
1	"	55 "	55 " "
10	"	60 "	600 " "
79	"	65 "	5135 " "
26	"	70 "	1820 " "
			7935 lin. ft.
			82555 lin. ft.

125

Mooring Piles 18 in.—			
4	piles,	60 ft. long.....	240 lin. ft.
2	"	75 "	150 " "
5	"	85 "	425 " "
			815 lin. ft.
			83370 lin. ft.

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