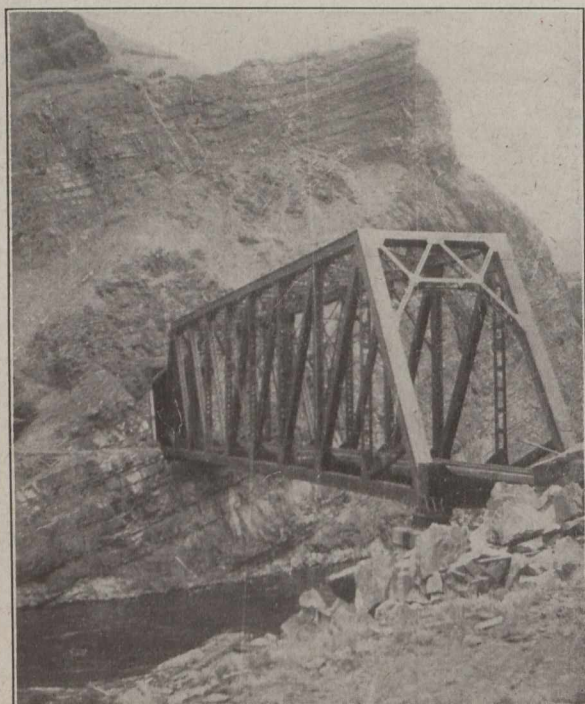


or by leasing and absorbing the provincial charters of other railways, whereby fertile valleys and mineral resources lying between the main line and the international boundary line have been developed. The company between Vancouver and Ruby Creek has 92 miles of double track.

The transcontinental line of the railway company enters the province by way of the Kicking Horse Pass at the summit of the Rocky Mountains, follows down the Kicking Horse River to Golden on the Columbia River, thence follows that stream to Beaver Mouth, ascending from there to Roger's Pass, the summit of the Selkirks, descending again following the Illecillawaet River to Revelstoke on the Columbia River, rising therefrom, the line passes through Eagle Pass, descending to Shuswap Lake, and thence following the valleys of the Thompson



Canadian Northern Pacific Railway Bridge No. 5, Over Thompson River, at Ashcroft, B.C.

and Fraser Rivers to Burrard Inlet and Vancouver, a distance of 521 miles.

The weight of rails first laid from Kicking Horse summit to Revelstoke was 70 pounds, from Revelstoke to Savona, 60 pounds. These have all been replaced with 85-pound rails with improved angle bars, and tie plates.

The ruling grades are as follows:—

East Bound:—

Cascade Section:—

Port Moody, 2 miles east	1.1%
Katz Landing to Hope, 3 miles	1.2%
Sailor Bar to Spuzum, 4 miles	1.2%

Thompson Section:—

Salmon River to Keefer, 4 miles	1.1%
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Shuswap Section:—

Stormont to Notch Hill, 9 miles	1.1%
Craigellachie to Clan William, 10 miles.....	1.1%

Mountain Section:—

Revelstoke to Albert Canyon, 20 miles	1.2%
Albert Canyon to Rogers Pass, 20 miles.....	2.2%
Golden to Linchoil, 15 miles	1.7%
Otter Tail to 2 miles west of Field, 4 miles...	2%
Field to Tunnel, 2 miles	2.2%
Tunnel to Kicking Horse Lake, 5 miles	4.5%
Kicking Horse Lake to Hector, 2 miles	2%

West Bound:—

Mountain Section:—

Field to 2 miles west	2%
Beaver Mouth to Rogers Pass, 23 miles	2.2%

Shuswap Section:—

Revelstoke from Columbia River Bridge to Clan William, 8 miles	1.3%
Tappin Siding to Notch Hill, 8 miles	1.3%

Thompson Section:—

Penny's Grade, 3 miles	1.1%
Cisco, 2 miles	1.1%
Salmon River west, 2 miles	1.1%

Cascade Section:—

2 miles east to Spuzum	1.1%
1 mile east to Yale	1.1%
1 mile east of Hope	1%

One notable betterment is the great reduction which has been carried out on the hill between the tunnel and Kicking Horse Lake, whereby the 4.5% grade has been reduced to 2¼% grade, but lengthening the line four miles with the assistance of two spiral tunnels.

Another very important improvement in the location of the line is at present in progress at Roger's Pass, whereby the 2% grade, compensated, ascending westwards to, and descending from the summit of Roger's Pass, will be very greatly reduced, the line shortened by 4.3 miles and about five miles of snow sheds avoided. This change entails a tunnel, double tracked in anticipation of future needs, five miles in length, one of the longest, if not the longest, on the continent. The grade reduction is the difference in elevation between the summit of the Pass and that of the highest point in the tunnel near the west portal, namely, 552.6 ft.

Entering the east portal the grade rises .95% for a distance of 4¾ miles, then follows a quarter of a mile of level grade to the west portal, the grade therefrom falls for three-quarters of a mile at the rate of .50% and thence at 2% compensated, to connection with the original main line where the grade is the same.

The diversion commences 76.55 miles west of the divisional point at Field and terminates at 87.05 miles.

The bridge erected by the Dominion Government over the Fraser River at Cisco, 152 miles east of Vancouver, was a cantilever type designed by Mr. Snider, of New York, fabricated at Birmingham, England, shipped to Esquimalt and erected in place by the San Francisco Bridge Company in 1884. It was the first bridge of this kind designed for railway purposes.

Previously to being shipped, it was put together at the shops and was there seen by some engineers who ordered a similar structure for the Niagara River below the Falls. It was manufactured of iron and shipped, and was erected before the Cisco bridge, so that although the latter was the first railway cantilever bridge made it was not the first erected.

The total length of the bridge was 529 feet, ballast wall to ballast wall of abutments, the centre span being 315 feet centre to centre of piers.

The traffic becoming heavier, the weight of the locomotive was increased from 100 to 200 tons. It was thereupon decided to replace the cantilever bridge with a steel through truss centre span and deck shore spans. This replacement was carried out without any interruption to traffic by the Dominion Bridge Company. The old bridge has been re-erected over a deep ravine on the Esquimalt and Nanaimo Railway within a short distance of Victoria.

The paper then reviews the history of the construction, and of the development resulting therefrom of the various branch lines and extensions of the C.P.R. in British Columbia, with particular reference to the Kootenay Central Railway; the Revelstoke-Arrowhead-