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## Crow's Nest Pass Railway Location & Construction.

*By J. L. Davidson.*

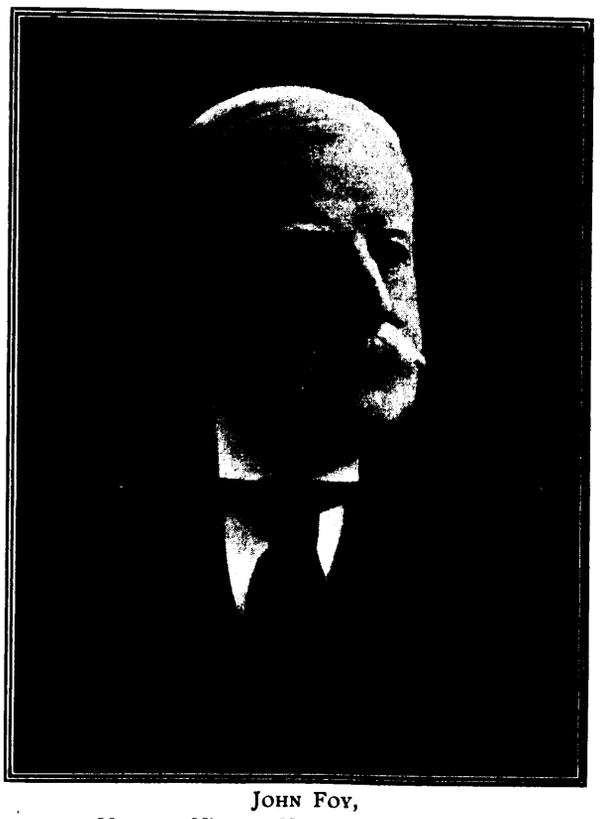
The construction of the Crow's Nest Ry. was notable, from an engineering standpoint, for at least two features, the celerity of construction & the skill shown in overcoming serious obstacles. To build a road through the Rocky Mountains, with a maximum grade of 1%, seems well-nigh impossible, yet this has not been exceeded, & the railway is the best which crosses the mountains.

Location was commenced in April, 1897, at Lethbridge, Alberta, &, since preliminary lines had been run in 1892-3, there was a good idea as to the general route to be followed. Starting from Lethbridge, it ran to Fort MacLeod, thence to Pincher Creek, following the middle fork of Old Man River to the summit of the Rocky Mountains, down Michel Creek to Elk River, thence to Kootenay River, to Cranbrook & to Moyie Lake, along Moyie Lake, down Moyie River to Goat River Summit, down Goat River to Kootenay Flats, round the west side of Kootenay Lake to the Narrows, & down the Narrows to Nelson; in all, a distance of 290 miles.

Location was carried on from 5 or 6 different bases; westward from Lethbridge, starting in April; westward from Elk River to Kootenay River, starting in May; westward from Wardner to Moyie Lake in May; down Moyie River from the foot of Moyie Lake to Goat River Summit, starting in July; from the summit westward to Kootenay Flats in Nov., & from Kootenay Flats round the lake to Nelson in April, 1898. All the location proper was finished in March, 1898, although a good deal of re-location was going on during construction.

On leaving Lethbridge it is about a ½ mile to St. Mary's River, where there is about 3 miles of trestle-work. A fly-line was run down along the side hill to the flats, so that the steam pile-drivers could be working below, as well as above. Three tracks were run along the course of the road, 1 outside of the trestle-work, & 2 inside. The steam pile-driver, driving the outside sloping piles, came first, followed by the one driving the upright piles. The 1st pile-driver was on 2 flat cars, 1 on each track, & was shifted from side to side as the piles were driven. With the upright piles the driving was done at the rear end of the cars, as the piles were driven in between the tracks. In the meantime, material was brought along on the track outside, a steam timber derrick putting it in place for the pile-driver. Pile-drivers were at work up above from the east end of the bridge. In this way the trestle was constructed in remarkably quick time. Temporary work was constructed under the span by means of decks, the decks being brought along already made up. One deck was laid on top of another till the necessary height was reached; the span was then placed in position, & the temporary work taken away.

The line crosses the valley, swings around a 10° curve on the trestle, & follows along the coulees. Very heavy cuts are encountered here; one, after the slopes being taken out, was 120,000 cubic yards. A trestle, 900 ft. long, is next, with a 200 ft. span. Heavy cuts again intervene, & 6-mile coulee bridge is reached. Piles were driven to a height of 40 ft., & then decks of 15 ft. were strung across on the temporary work, & pulled up into position. A cable was stretched across



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the coulee, block & pulley were attached to the cable, & the bents placed in position one by one. It was impossible to locate around the hogs backs that jutted out from the side hill, so that it was necessary to have trestles & heavy cuts.

Eight-mile coulee trestle is next reached; this is 600 ft. long & 110 ft. high. The piles were driven to a height of 50 ft. There is a 15-ft. deck & bents up to grade here. After passing through a very heavy cut, a trestle 900 ft. long on a 3° curve was constructed in the same manner as the one above mentioned. Heavy cuts & fills with a few small trestles were encountered till 16-mile coulee trestle was reached. This is 800 ft. long & 133 ft. high, with 200 ft. span. The temporary work consisted of 3 decks for the span, 35 ft. each, the bents being 15 ft. apart.

The line now comes out on the rolling prairie, & no difficulty is encountered to MacLeod, 37 miles. The road then follows up the Old Man River, & crosses Pincher Creek, 22 miles distant, with a trestle 1,200 ft. long & 122 ft. high, with a span 250 ft. long. It then follows the south side of Old Man River, with a rising grade, till the south fork of Old Man River is crossed. This bridge is 840 ft. long, & 135 ft. high, 2 spans of 150 ft. each, piles 30 ft. & decks of 15 ft. bents; temporary work for spans, 15 ft. bents 15 ft. apart for 70 ft. in height, then 30 ft. deck to span. The road then winds in and out along the south bank of the Old Man River, & the foot-hills of the Rockies are soon reached. Heavy rock cuts are encountered now. A trestle was erected on a 4° curve over a dam, but the whole side hill, 1,200 ft. across, started to move toward the river; the trestle had to be abandoned, a lower grade taken, & a fill was made instead of trestling. It was necessary to keep ballasting this, as the grade kept sinking. The cause of this, from all appearances, is that there is loose material embedded in the hollow, the sides & bottom of which are solid rock.

The entrance of the pass is made at 92 miles. In the mountain division trestling & culverts are of the greatest importance, as they are used in very great numbers. The trestles consist of single deck trestles up to 40 ft.; on soft material piles are used & on hard ground mud sills are used. The standard trestles run up to 110 ft., with diagonal bracing on all over 2 decks. The culverts employed are box, pile & open; box culverts are the most used culverts in a mountainous country, & on this road are used in great numbers. Where there is a fill in a drain a culvert was put in, unless the water could be drained along the side of the dump. If there is a small stream the size is generally 3 x 3 ft. Box culverts vary in size from 2-4 ft. in width, & from 2-5 ft. high. Sometimes it was necessary to put in a double box culvert; these are generally 4 x 4 ft. Some of these on this road are over 100 ft. long. Open culverts are generally pile culverts, & are from 6-14 ft. in width. Mud sills used on hard ground. Open culverts are used up to a height of 5 ft. for spans of 12-14 ft. Eight stringers are used.

The line follows up and crosses the Old Man River with a single span. In 3 places the course of the river was changed, as a much better location was to be had by this change. There is a steady rise in the grade, heavy cuts & fills are now the order. Crow's Nest Lake is next reached at 100 miles from Lethbridge. Very heavy rock cuts are encountered along this lake, with grade still going up. The divide or summit of the