

ROADS AND PAVEMENTS

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Many had lost sight of the most important point, namely, the impossibility of locating good roads so long as the Ontario law obliged the placing of the road allowance upon the survey section lines instead of upon the grade contours as nature made them. In the old countries there are no section lines, and new roads are located by an engineer in strict accordance with the topographical features of the country, upon the best economical grades and curved lines that the country permits of.

Take as an illustration a country well known to the writer, where long sections of road have been built, including such work as grading round a rough, rock-bound coast, including short tunnels, sea coast protection, metal bridges, sunk cylinders, masonry, arch bridges and culverts, etc.

In the county surveyor's office one engineer took charge of the roads, laid them all out, designed their structures, etc.

When a new road was to be located and built, this man made a preliminary survey, whereby he obtained a plan and profile. To locate this road, the same engineer would employ about half a dozen men (in tolerably clear country) and buy a bundle of plasterer's laths. He would be seen to go ahead with his preliminary plan and profile in hand accompanied by a man with the laths, and to be occupied in placing these in a grade contour line so far as possible, forming the centre line of the road. Behind him would come two men, chaining and staking 100-link lengths of a statute chain (66 feet), and behind them again would be two men levelling. Last of all would come one man picking up laths and taking them forward to the man in front, who was along with the engineer marking the course of the centre line. After this was finished, the centre line would be traversed (in a country of which no maps were procurable) and all the stakes offset from the traverse line to form permanent record and plan. This last was the practice used by the writer in South America for the very hilly road between Valparaiso and Casa Blanca, to remove the public road from the watershed of the Valparaiso waterworks. This practice differs only from our ordinary railway survey in the fact that it requires a better trained eye than that which is required for railway work, which consists of an elaborate system of contours that consume more time and cost more money. These laths being of equal lengths, their tops indicate more or less the uniformity of the grade the engineer is marking by eyesight, from point to point, and his preliminary plan and profile does for him the rest. In a short editorial the *Toronto "Globe"* approved of the letter referred to for its practicality, and recommended it to those interested in the Good Roads movement.

For quite a different reason it may be said that the practice here described applies in great measure to the trails and roads of the Upper Country in British Columbia, than upon some of which it would be impossible to conceive how money could have been more improvidently spent, due to the fact that these trails and roads were not generally subjected, first, to a method practical, yet scientific, rapid, yet definite, but more often laid out by some road boss or local expert, who never knew that falling from a summit one should not rise, and rising to a summit one should avoid and that for packing purposes with animals one should avoid creek crossings with soft bottoms, where animals are sure to mire before repairs can be made. There are trails inside the bend of the Fraser River where a man going in to mine some years ago lost his whole pack-train, loaded only 250

pounds each, and where an engineer exploring a railway line durst not pack his animals over 150 pounds each.

There is a main road leading to the 150-Mile House that had upon it some years ago a hill that reduced the traffic capacity by 50 per cent. of the load that could otherwise be carried, and thus without necessity for such a sacrifice. These defects remind one of the Irishman's opinion when the election candidate was discussing absentee landlords, he said: "Begorra, yer honor, the courthouse is full of them." To have built all these trails and roads upon the best lines in the first instance might have been difficult, although not so costly as their future conversion into anything like efficient work.

There are some examples of trails cut in the Upper Country that were fairly good, most of them by the Dominion Government about thirty-six years ago, more or less, being old survey pack trails of the Dominion Government survey of the C.P.R. before the days of the company. The old telegraph trail, which bore marks of care in its exploration by duly qualified engineers, was undoubtedly an intelligent and well-placed work, as also the trail from Kamloops up to Tete Jaune cache. With the lapse of time facilities improve, and, as we have arrived at the time when the general public all over the continent has become interested in good roads, there should no longer be Government trails nor roads constructed except upon some scientific basis, such as that above described, thus finally forming out of that which was first a trail the route of a good road.

The system here advocated can be used for either clear or bush-covered country. If the latter, the leveller is in front with the engineer, and the transit or zenith instrument behind. The sequence of operations would be: (1) Cut first the trial line and survey pack trail. (2) Cut second the centre line of a good road or trail as described. The final result will be a well-placed and efficient public work upon which the best roads can be packed or hauled that the configuration of the country will admit of. The final result of work done at random, without any basis of definite technique, will never be other than guesswork, including costly rectifications. It is just as important in the public interest that a trail, to be finally converted into a good road, should be properly located in the first instance as it is that a railway line should be treated in a similar way. There are many other points in the same connection that will suggest themselves to those accustomed to road-building, but enough said now to illustrate the importance of the omission above referred to. Treating of trails, it may be pertinent to note that one of the most useful still left to open up the country east of and parallel with the coast range is spoken of in the local press as possible.

This is the trail that should have been cut any time in the last thirty-five years; in fact, as soon as possible after the Waddington Road, via the Homathco River, was abandoned.

The building of this trail would probably have resulted in the settlement of the whole flank of the coast range from the head of the Homathco River up to the Blackwater. This, instead of obliging the people now, there within fifty miles of the coast to go round 300 to 400 miles in order to reach the salt water. There is a large extent of country there, nearly all of it inside the northern limits of the bunch grass country, abutting upon the eastern toe of the coast range, much of it irrigable and capable of affording the finest water-powers in British Columbia. The only thing that need surprise one is that the settlers throughout the Chilicotin country did not leave it fifteen or more years ago, due to the hopeless want of foresight of the powers that were. Since