The Good Roads Movement in Ontario.

The problems of transportation have never before received so great attention from the Canadian public as during the past year, and the present outlook is that this interest will be intensified rather than diminished for some years to come. In Ontario the southerly section is already a network of steam railways, yet more are being constructed or proposed. For Northern Ontario numerous railways are being projected, The Ontario Government in keeping with this spirit, is building a provincial railway from existing connections, into the territory adjacent to Lake Temiskaming, now being rapidly occupied by the flow of population from the older section to the south. Electric radial railways are asserting their utility and are steadily being extended from centres of population, along country high ways into the surrounding farm districts.

Millions of dollars have been and are being poured out by private corporations, the Dominion Government, the Provinces and municipalities, upon railways, canals, harbors, lake and ocean steamship lines, for the purpose of transporting the products of Canada's almost illimitable extent of forest, field and mine. Without common country roads, the enormous expenditure would be futile and barren of results. Every ton that is carried by railway or steamer, has first to be transported over the country roads.

The value of land is created by making it accessible, and the more perfect the means of reaching it, the more readily will land attain its greatest value. The great drawback to settlement in new districts, the cause of hardships experienced by pioneers, is the lack of means of communication Land excepted, the value of all material things, in part at least, is created by transferring them from their original position to another.

Despite the value of good roads, their improvement in Ontario has not kept pace with the construction of the greater trunk lines, the railways, and the highest development of the resources of the Province have been retarded thereby. While railways have, in some respects, altered the direction and character of traffic on the roads, the actual number of vehicles is greater than it ever was before, and this traffic must increase rather than diminish. The awakening, however, has come, and "good roads" is becoming the motto of municipal and Provincial organizations.

The agitation for better roads has developed two features of the subject, one, to which reference has been made, the value which improved roads would be to the entire Province; the other, the great need for establishing better methods for directing the present outlay on roads. It is not, at the present time, so much an increase in the amount spent on roads that is needed, but rather that the system of making the expenditure shall be rendered more efficient. A Select Committee of the British House of Commons, nearly a century ago, as the result of evidence regarding road management said: "The most improved system is demonstrated to be the most economical; and even the first effectual repair of a bad road may be accomplished with little, if any, increase of expenditure, and its future preservation in good order will, under judicious management, be attended with considerable saving to the public.

What was true then of England, is true in Canada to day. The money now being expended upon roads, and the work performed, is in most cases, scattered in small amounts, irrespective of the greater need of certain roads, or parts of roads, and the amount of travel over them. A thin veneering of disconnected improvements is soon lost, and the roads return to their former condition. With the application of money to definite and substantial improvements, the results are far different and in a few years a marked improvement will be made in the average condition of the highways. It is not always necessary that the amount spent shall be large, in order that it may be economically expended. The one principle underlies the expenditure of $50 and of $5,000, that whatever is done, must be well done.

Arch Culverts.

Concrete or other durable culvert tile are to be recommended for small waterways, where there can be no doubt as to their sufficiency to accomodate the maximum flow of water. A difficulty with tile, however, has been that they are frequently used in places where a larger waterway should be provided; and while they may be large enough for the greatest flow of water for a period of years, yet there is apt to come a time of sudden flood or freshet when they are subjected to a rush of water for which they have not capacity, and a washout results.

For this reason, when putting in culverts which it is desired shall be permanent, care should be taken to provide a waterway of ample size for the unusual, not the usual, amount of flow. To this end, arch culverts of concrete or stone masonry should be employed. Of the two material, the cheaper is concrete made of gravel and Portland cement; or of broken stone, sand and Portland cement. If properly made, concrete is not only cheaper but is equally as durable as stone masonry.

The cost of a concrete culvert will range from about $4.50 to $6.50 per cubic yard of concrete in the structure. This variation is created by the various details, the availability of gravel, the cost of Portland cement, the cost of labor and other items. The first to be constructed by a municipality always costs more than subsequent work.

A stone arch is so designed that the stones will remain in place without being held together by mortar. Concrete arches, on the other hand, are dependent upon the cohesive strength of the materials. Good workmanship and good materials, are therefore of exceedingly great importance in building concrete arch culverts. It is also essential that the sidewalls of arch culverts shall rest on a firm stratum of hardpan, gravel, compact earth, or other unyielding base, so that there will be the least possible settlement. If settlement occurs to any extent, it is rarely uniform, and the arch is thereby likely to be distorted and cracked. Usually it is necessary to excavate, for the sidewalls, a depth of about three feet below the bed of the stream. A certain depth is necessary in any location in order that the sidewalls may not only be safe from settlement, but also from the undermining tendency of the stream.

Highway Bridges.

Highway bridges are now being commonly constructed with steel superstructures, and concrete or stone masonry abutments. When timber of the best quality was more plentiful and cheaper than now, wooden bridges were no doubt most economical, but with the growing scarcity of lumber, the increased price, and poorer quality obtainable, the more durable, if more expensive materials will, after a term of years, be found the cheapest.

Wooden bridges, supported on piles do not now last for more than eight or ten years, during which period a considerable amount has to be spent for repairs. Concrete piers and abutments, if well built, should last a century or more, while the steel super-structure, with proper attention should last at least half as long. So that although the initial cost of a wooden bridge may be only one-half or one-third that of a steel and concrete structure, the latter will in the end, be the cheapest. In addition it will be safer, less liable to collapse, and will be more convenient for traffic.

Well made concrete is cheaper and fully as durable as stone masonry. Just as the cost of stone masonry varies at different localities, in accordance with the cost of stone, labor, etc., so the cost of concrete will vary according to the relative cost of gravel, broken stone, Portland cement and labor. For piers and abutments, the cost of concrete usually ranges from $4 to $6 per cubic yard, as compared with stone masonry at from $10 to $14 per cubic yard. Under almost any circumstances concrete is cheaper than stone masonry.

Among the recent uses to which concrete has been applied, is the making of bridge floors. In the County of Elgin more of this class of work has been done than elsewhere in the Province, and so satisfactory has experience been with these floors, that they are being used on all county bridges. Plank floors wear out in from two to four years and are a constant matter of expense.

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