

The commissioner should be retained in office as permanently as circumstances permit, in order that his experience, increasing from year to year, may enable him to do more perfect and economical work. Continuance in office should also be the reward of good service. Independent, capable road overseers are needed.

The commissioner should have exclusive control and management of the maintenance, repair and improvement of all the public roads and bridges within his division, in so far as the commutation and other moneys belonging or appropriated to his division, will enable him to do so, subject always to such written instructions as he may receive from the council, or from the road and bridge committee of his division.

It is of the greatest importance that the commissioners should be men of good judgment, practical, with ability to direct labor to advantage. The selection of suitable men as commissioners is of the greatest importance, as upon him will largely depend the success of any system adopted.

BRIDGE SITES.

The question of choosing the site of bridges is an important one. If the selection is not restricted to a particular point, the river should be examined for a considerable distance above and below what would be the most convenient point for crossing; and if a better site is found, the line of the road must be made subordinate to it. If several practicable crossings exist, they must be carefully compared in order to select the one most advantageous. The following are controlling conditions: (1) Good character of the river bed, affording a firm foundation. If rock is present near the surface of the river-bed, the foundation will be easy of execution and stability and economy will be insured. (2) Stability of the river banks, thus securing a permanent concentration of the waters in the same bed. (3) The axis of the bridge should be at right angles to the direction of the current. (4) Bends in the river are not suitable locality and should be avoided if possible. A straight reach above the bridge should be secured if possible.

In making the final selection, the principles to be observed as far as practicable are:

Follow the route which affords the easiest grades. The easiest grade for a given road will depend upon the kind of covering adopted for its surface.

Connect the places by the shortest and most direct route commensurate with easy grades.

Avoid all unnecessary ascents and descents. When a road is encumbered with useless ascents, the wasteful expenditure of power is considerable.

Give a centre line such a position, with reference to the natural surface of the ground, that the cost of construction shall be reduced to the smallest possible amount.

Cross all obstacles (where structures are necessary) as nearly as possible at right angles.

Cross ridges through the lowest pass which occurs.

Cross either under or over railroads, for grade crossings mean danger to every user of the highway. Guards and gates frequently fail to afford protection, and the daily press is filled with accounts of accidents more or less serious, and while statistics fail to give total casualties, the aggregate must be great.

OIL IN ROAD-MAKING.

The use of oil on roads is a matter which is frequently brought to our notice from the success attained in California by the use of this material on the road surface. The roads in many parts of Southern California are excessively sandy, and it was more with the object of reducing the dust that oil was first applied, than with the

expectation that a materially better road would result. In this it appears to have been most successful. Dust was the great bane of life in California. Raised in clouds by passing vehicles, it entered windows destroying furniture and draperies, and ruined the product of field and orchard for a considerable width on each side of the road. That the use of oil would remove such conditions may well account for its popularity in California.

The use of oil, however, appears to have accomplished more on these sand roads than to merely subdue the dust. The repeated application to the roads has built over them a tough surface resembling asphalt. Roads which were once impassable have, according to visitors to California, become ideal in their firmness and smoothness. This treatment first applied to sand roads has been used with success on all classes, loam, clay, macadam, and with remarkable results.

The oil used is a crude petroleum, but contains a large percentage of asphalt or bitumen. On light sandy roads, the roadway is first drained, graded, and rolled. The surface is then lightly picked up with a harrow and the oil is poured over it. This oiled surface is then stirred up with a harrow or rake, the aim being to produce an oiled crust three inches thick.

In the case of an old macadam or hard clay road the surface is first cleaned and shaped. Oil is sprinkled over it, and on this a coating of sand is spread to absorb the oil. This process is repeated until a crust of the desired thickness is produced.

Some slight experiment has been made in Ontario with oil on the roads, but climatic conditions and the quality of crude Ontario oil are not so favorable to this treatment as in California. Ontario oil contains less matter of an asphaltic nature and the severe conditions of spring and winter permit the oiled crust to be broken through, so that the effect of oil cannot be so permanent as in California. Oil on the streets has been objected to also, for the reason that the oily mud is so very injurious to clothing.

The use of oil in California has its greatest analogy in Ontario, in the making of tar macadam streets, so successful in Hamilton and elsewhere. While the oiled roads of California are of interest and may lead to suggestions applicable to Canadian conditions, yet the results so far attained have not been such as to commend the treatment for general use.

The electors of the Township of Ernestown have carried a by-law providing for a loan of \$20,000 to the Ontario Electric Railway Company, by a vote of 348 for the by-law and 79 against.

Among the municipal works in progress at the present time are water supply systems in Palmerston, Creemore, and Grimsby. Palmerston is also commencing a sewerage system. The Creemore waterworks will be a gravitation system to cost \$20,000. The Grimsby waterworks comprises a pump house and filtering basin on the beach, and a reservoir on the mountain. For this work \$34,000 is to be raised.

Municipal ownership is giving satisfaction in Guelph. The city has managed its lighting system for one year. During this first year the receipts were \$20,000. The net earnings after paying interest were \$10,000. Out of this \$5,000 was devoted to extensions, and \$2,000 went to pay the first principal coupon on debentures. The city authorities expect the business to increase during the coming year, and have better contracts for coal. Consequently they expect to make a still better showing in the second year of their municipal lighting plant.