

has turned towards collecting the most important roads of each county, and placing them under the management of the county council. It has been shown that, by such means, roadmaking can be placed on a more business-like basis, and consequently greater efficiency is secured. It provides for a more equitable system of levying the cost, for a better use of modern machinery, and for a higher grade of oversight and workmanship. At the present time township councils are unable to maintain the roads by statute labor, and are, in consequence, compelled to make annual appropriations of money from the general tax. This money is, in the main, spent on the roads which would comprise a county system, but owing to the contracted character of the system, township councils cannot expect to apply this expenditure to the greatest advantage.

A greater cost to the individual citizen need not be feared as no greater road mileage is to be maintained. The effect of a county system is merely to group the most heavily travelled roads under one management, where they can be most economically maintained.

The Township System Outlined.

The chief points in the system of road management in townships where improved methods have been adopted include the following:

Statute labor is commuted at a fixed rate per day, and the amount is collected at the same time as the other taxes, by the township tax collector.

The township, if desired, is divided into a convenient number of road divisions for road purposes, usually two, three or four, and a road commissioner is appointed over each.

The duties of the road commissioner are:

(a) To supervise all work and repairs done on the roads and bridges within his division.

(b) To acquaint himself with the best methods of constructing and maintaining good roads, and of operating graders and other road machinery used by the township.

(c) To employ, direct and discharge all men and teams required to carry on the work and to purchase necessary materials.

(d) To see that all washouts, drain and culvert obstructions, bridge failures, and other unforeseen defects are repaired or protected, with the least possible delay, so as to prevent further injury to the road or accident to the users of the road, and to otherwise act promptly in all cases of emergency.

(e) To report to the council early in each year as to the work required the coming season, and to carry out the instructions of the council, with regard thereto, and to perform such other services as may be required of him, from time to time, under the written instructions of the council.

(f) To collect the poll-tax in his division.

(g) To keep an accurate record of the men employed, and the work done, and to furnish this written form to the reeve at proper intervals, in order that the reeve, upon being satisfied of the correctness of the statement, may issue cheques for payment thereof.

(h) To stake out all works and see that they are undertaken systematically, so that no time will be lost in taking men, teams and machinery from one part of the township to another.

The usual road appropriation is made from the general funds of the township, this to be applied to the purchase of tools, machinery and materials, or to small jobs and contracts.

The residents of the township are employed to do the work, provided they come properly equipped, and will do a fair amount of work.

Work is paid in cash, if desired, but preferably by cheque; payment to be made in accordance with the pay-roll submitted by the road commissioner or overseer, accompanied by necessary vouchers, and such information as may be considered necessary.

A general plan for road improvement should be laid down by the council for the commissioner to follow.

This plan should specify the width to be graded, width and depth of road metal, character of drainage, etc., of all roads.

Roads of importance should not be less than twenty-four feet between the inside edges of the open ditches. No road should be of less width than eighteen feet.

All roadmaking machines should be in the care of the road commissioner.

The same man and teams should be hired to operate the machinery for the entire season, as they become proficient and do better work. This applies particularly to the operation of a road grader.

The council appoints foremen in different parts of the township to collect the necessary labor, and act promptly when roads are blocked with snow; the men employed to be paid in cash by the council.

Traction Engine Trains.

A novel method for improving the system of transportation in the new settlements of Northern Ontario is being considered by the provincial department of highways. It is the establishment of traction engine trains between distant points in newly settled communities and the railway or lake connections. The intention is to place the leading roads in fairly good condition, serviceable for ordinary traffic, and instead of the stage-coach lines of earlier days, comfortable vans for passenger and freight traffic will be hauled by traction engines. Where the roads have been built with this object in view, the grades and surface condition will naturally be better than for the ordin-

ary colonization roads, and being completed between the distant points, will, it is thought, be a sufficient inducement to private parties to provide and operate the trains. The traction engines now being built, of high speed and power, for road work would be much more serviceable than horse power. With the exception of a short time during the spring and fall, they would be capable of running on schedule time.

The Road Roller.

The advantages to be derived from a roller in the construction of a broken stone road are becoming more and more appreciated. Unless a roller is used the stone must be spread loosely on the road and left for traffic to consolidate. A road should be made for traffic, not by it. To leave loose gravel and stone in the roadway is neither an agreeable method of constructing a road, nor will it produce the most durable road.

The consolidation of loosely spread stone or gravel by traffic is a slow process, causing much inconvenience to travel, during which the earth of the subsoil becomes mixed with the stone. Earth intermixed with stone prevents the strong mechanical bond which clean metal will assume when the stones are wedged one against the other by a roller. The particles of earth, when wet, have a lubricating influence on the stone, and under the action of wheels the surface is more readily broken up. By the use of a roller the earth subsoil should be first thoroughly consolidated. The stone should be placed on this foundation in layers, and each layer well compacted. In this way a smooth, durable, waterproof coating of stone, free from earthy material, can be laid over a firm foundation.

There are different classes of rollers. The horse roller, weighing six or eight tons, will do fairly well if a steam roller cannot be afforded, but the horse roller is not sufficiently heavy for the best results. It has to be used much longer than the steam roller. The feet of the horses, in exerting sufficient strength to move the roller, sink into and disturb the road metal, and injure the shape and quality of the roadway, while on hills it is at a disadvantage.

The steam rollers are of various weights, ranging from eight to twenty tons. Rollers of fifteen tons weight are those generally used by the towns and cities of Ontario. The cost of horse rollers is usually about \$90 per ton, or from \$500 to \$800 each. Horse rollers are, however, generally so constructed that the weight may be increased by iron castings; so that a roller of five tons may be made to weigh about six. Steam rollers cost about \$3,000. For operation a horse roller with two teams will cost \$6.00 per day. A steam roller will cost \$10.00 per day, but will do three times the amount of work done by a horse roller, so that the saving in operation is considerable.