

The Road Grader.

During the past season in over 300 townships of Ontario, grading machines were used in improving the roads. That so many different methods of operating these machines should be employed, points strongly to the necessity of laying down some uniform system for regulating this important part of the work of road-making in order that the best results may be produced. A road grader is the most necessary implement for a township to possess, and in fact, some townships are so convinced of this as to have invested in four machines, placing one in each quarter of the township. The crowning of the roadway can be done very rapidly, cheaply, and perfectly, by their use. To depend upon manual work for the first grading of roads, and the repair of others that require re-shaping, is a useless waste of labor and money. But these machines in the hands of inexperienced men, are often made to injure rather than improve the road.

The operator must know how a road should be made, and how the grader should be worked in order to make each road with the least expenditure. A study of the different methods employed, and a talk with the different operators, shows that the ideas are as varied as can be imagined; many of them are so ridiculous as to make one wonder why they should be tolerated by any municipal management.

In one township the machine is purchased by the council, placed at the disposal of any pathmaster who sees fit to take it from the railway people, and to any other pathmaster who cares to take it from one beat to another. These men may have then seen the machine for the first time and know nothing whatever about its mechanism or how it should be operated.

The directions specify the number of teams required in ordinary soil. These are attached and if they do not provide sufficient power, others are added. The blade is plunged into solid clay, full, till as if the whole object was to determine its strength or test the merits of the different teams engaged.

Each pathmaster is permitted to stake out his own work to suit his peculiar ideas, and these usually differ from the next beat. The grade differs from 15 to 45 feet in the townships, and sometimes in the same beat. The amount of crown which should be given, is, of course, arbitrary and extends from the flat, and useless to the ridiculous and dangerous. Roads are often graded where the crown is already sufficient, and occasionally the machine is used for ungrading a piece which is already properly made.

It is a common occurrence to see old gravel roads with an excellent foundation requiring only trimming and re-surfacing, ruined by cutting off the sides and piling the dirt on top of the gravel. This practice has injured many miles of roads

in Ontario which cost large sums to construct.

Another plan employed is for the Council to hire the operator, the beats requiring his services to furnish the necessary teams, the work to be done according to the direction and dictation of the pathmaster, thus making the operator simply a part; the operator to be employed for the season's work only, and in fairness to others, the job must be passed around, so that he cannot expect to be hired for more than one season.

Another plan is for the Council to employ the operator and one team, the beats requiring the service of the machine to furnish the remaining team or teams. Still another; where the Township is divided into four wards or sections, to have one man and one team employed in each ward so as to distribute the honors and patronage, these men to have charge of the machines in their respective wards. In townships more advanced in this work, the operator and two teams are employed by the Council, he to appear when called upon at any beat in the Township even if he has to pass from a townline to the opposite one. He is given no plan to follow, no directions, but is supposed to exercise his best judgment in the performance of the work; except where his judgment may conflict with the idea of the pathmaster, in which case the pathmaster rules.

Under all foregoing plans, no attempt is made at operating the machine during the early part of the season when the ground is in fit condition, and when the work can be easily and properly performed; but the machine must remain idle awaiting the statute labor season when, as a general thing, especially in clay sections, the soil is baked so hard that perfect work cannot be done and it is unreasonable to expect satisfactory results. Often this work is commenced just when these roads are becoming serviceable and are ruined for the remainder of the summer. In such cases the investment is unprofitable, the labor is wasted, the roads are injured, farmers are deprived of services which are urgently required at this important season on the farm, and the benefits which would result from improvements upon the roads, if such labor was expended at a proper season and under plans, are lost to the community.

A proper plan to adopt would be as follows:

1. Prepare a complete plan of the township showing all road allowances, water courses, bridges, etc.

2. Classify these roads according to their importance, dividing them into, (a) main roads, (b) roads of moderate travel, (c) roads of least travel.

3. Prepare a proper specification fully describing the roads according to the above specification, setting forth the width of roadbed, plan of drainage, amount of crown, kind of material to be used as a covering, whether gravel or broken stone,

depth and width to which it should be laid, how the material shall be prepared and applied, etc.

4. The grading machine should be owned by the township, one man should be employed to have charge of and operate the machine, and he should be a fixed resident of the municipality in order that his services may be retained for a number of years. He should be thoroughly practical, and have some mechanical knowledge. He should be provided with a copy of the above specifications and each spring with a committee of the council should examine the roads and determine the portion to be graded, as far as possible extending the work of previous years, securing continuity and uniformity in all work.

5. The operator should hire a sufficient number of teams to work the machine, and the same teams should be always employed, in order that they may become accustomed to the work.

6. Where roads have already been gravelled, but the surface has become flattened by traffic and other causes, they should be carefully examined by the council, and all improvements required specified. As far as possible, the old gravel or stone roadbed should be preserved, and, except in cases where it is absolutely necessary to raise the grade, no earth should be placed upon it. But the shoulder should be cut off, turned outward and removed, and a new coating of metal applied to the centre of the road.

The Cost of Hill Taxes.

The tax we have to pay, because the original cattle tracks and paths lead abruptly up and down over hills, seems to be as immovable as the hills themselves which cause it. Immense sums would be eventually saved if many hill roads were re-located. In learning how to improve our highways and to construct new ones, it is well to learn where lines should run in order to insure economy in grades and reduce the tax on time, strength, wear and tear and maintenance caused by hills.

Writing on this subject in the *Portland Industrial Journal*, Mr. S. D. Gray tells of roads over hills which "must not be gone around because our fathers travelled them, and we may as well be foot-sore as they." He cites a case "in which both town and county commissioners refused to act. This road was two miles in length with eight rugged hills, four of them unsafe to ride up or down. All these hills could have been avoided and a level road made for less than \$1,000 that would pay for itself in ten years. The old hills still remain. What we need is an understanding not how to build our roads, but to say where our roads can and should be built."

Stratford has abolished the ward system.