

ceived by the state in a period of seven years from corporations have increased less than 1 per cent. while the actual value of their holdings has materially increased.

On the other hand, farm property has decreased several millions of dollars in value, but in the last eight years the tax upon real estate has been raised from \$30,000,000 to \$44,000,000, or an increase of 46 per cent. This excessive and increasing burden upon real estate indicates why people are moving away from the agricultural districts of Pennsylvania and settling in towns and cities. This measure being indorsed by the grange shows that the farmers of Pennsylvania are in favor of road improvement as provided for by this amendment. The position of farmers on the road question is also put before the people in its proper light.

The Road Grader.

Road graders are now so commonly employed in the construction and repair of roads, and their utility is so generally recognized, that it is scarcely necessary to further urge their adoption. They are a modern, labor-saving implement which do their work better and more cheaply than can be done by hand, and that nearly three hundred townships of Ontario have purchased them is forcible evidence of their value. It is not their use which it now seems necessary to urge, but rather there is need of guarding against their mis-use.

In too many townships the councils have rested content with merely buying a grader, and, having done this, seem to be satisfied that they have done their full duty. Unfortunately the grading machine is not possessed of intelligence, it does not know when or how a road should be graded. So that, unless a method is established, and unless a capable man is engaged to operate it, the grader is likely to give but little service. There are three questions which naturally present themselves in connection with the use of a grader which councillors and road commissioners should distinctly answer.

WHEN?

When should the grader be used?

Arrangements should be made every spring to have the grader ready and in use as soon as the ground is sufficiently dry. The soil is then in its best condition for manipulation, having been mellowed by frost; the roads are rough and most in need of treatment. Roads which are properly graded early in the spring are at once compacted by traffic and they will remain in their best condition all summer. If the work is left until late in the season, clay soils have become baked and hardened, difficult to handle and rough when finished. Sandy soils, if loosened up late in the year will be much more dusty than if treated early in the spring when they are damp and readily compacted by traffic.

WHERE?

Where should the grader be operated?

This is a query which few townships have answered satisfactorily and it is of first importance that they should do so. It should be the duty of the township road commissioners, councillors, or a committee of the council (according to the local system of road management) to go over the roads early in the spring, and determine what grading is required.

This work should be staked out according to definite widths and dimensions of the roads as required by township regulations. The grader, when it commences in the spring, should proceed to each piece of work consecutively, and should be in use continuously until all the grading is done for that year.

At the present time it is customary for the grading machines to go here and there over the township without method—one day on one side of the township, next day on the opposite side, then to another distant part, backward and forward, wasting a considerable part of the wages of men and teams in moving from one part of the township to another. By following the method described above, the cost of moving the machine between the different pieces of work is reduced to a minimum.

Some distinction should be made between the grading of new roads, and repairs of old roads. Where the roads are being metalled from year to year with gravel or broken stone, it is, as a rule, a waste of money to grade a greater length of road than can be graveled or macadamized the same year.

HOW?

How should the roads be graded?

One of the first essentials in providing that the roads will be properly graded is to select the right man to operate the grader. He should be an active, energetic man, with some mechanical experience; one who will take an interest in his work, who will make a study of roadmaking and who will be willing to follow the instructions given him by the township road commissioner or councillor having supervision of the work. When such a man is found he should be engaged from year to year so that his growing experience will render him more efficient.

There are many townships which do not employ a regular operator, but instead allow the grading machine to be handled by any one and every one. In some cases it is even passed around in the performance of statute labor from beat to beat. Managed in so crude a manner, a grading machine will be a source of disappointment only.

The same horses should be used in operating the grader for an entire season at least, and as far as possible, from year to year. "Green" horses are very awkward, will not pull together, waste much time, and even a reliable man as operator cannot, under such circumstances, perform good work. It is a great waste in many ways to attempt to use a grading

machine with horses provided, as is sometimes done, as a part of statute labor. Horses used continuously become accustomed to the work, to each other, and to the driver, and will produce much better results.

Some townships, instead of horses, use a traction engine. Where one can be rented from a local thresher, it can usually be obtained very cheaply in the early part of the year. Where a considerable stretch has to be graded without turning, as in cutting off the shoulders of old gravel roads, a traction engine is much preferable to horses. It is more steady and does not stop to rest.

The township regulations as to the width and dimensions of road should be closely followed in grading. These will generally provide for a width of twenty-four feet between the inside edges of the open drains on roads of greatest travel; twenty feet on roads of moderate travel; and eighteen feet on roads of least travel. A rise of one inch to the foot, from the inside edge of the drain to centre of the road, is ample crown for a new road. More than this is unnecessary and an injury. There is a tendency, in the use of the graders, to crown the roads excessively, and this should be guarded against.

Road graders are of much use in the repair of old gravel and stone roads in restoring the crown. Unfortunately, it is no exaggeration to say that miles of roads have been ruined by a mis-use of the grader in this work. Old roads are commonly flat, rutted, sometimes concave, with square shoulders at the side. In repairing these roads there may be a small amount of stone which has been crowded out by the wheels of vehicles, and which it is safe to draw again to the centre of road. On no account, however, should the square shoulders at the side be drawn to the centre of the road. These shoulders are composed of earth and sod, and if placed on top of the stone road will merely turn to slush in wet weather and utterly ruin the road. The only way to repair such roads is to cut off these shoulders, throwing them away from the road, across the open ditch if necessary, and then to restore the crown by placing a coating of new gravel in the centre of road.

The grading machines are exceedingly valuable implements in roadmaking, but there is a proper time, place and way, and councillors using them cannot too soon provide a practical solution.

"Could you do somethin' fer a pore ole sailor?" asked the wanderer at the gate.

"Pore old sailor?" echoed the lady at the tub.

"Yes'm. I follered the wotter fer twenty years."

"Well," said the lady at the tub, after a critical look, "you certainly don't look as if you'd ever ketched up with it," and resumed her Delsartean exercise of determination.