

THE ROADSIDES. The strips of ground between the metalled road and the open ditch should be properly graded to conform with the crown and grade of the metalling and should be seeded and kept in sod. This will always be pleasing to the eye, is cheap and very largely useful in preventing the carrying of mud on to the metalling. Moreover, the uniformity of the grade facilitates the passing of meeting teams.

LOCATION OF SUB-DRAINS. In a soil that is gravelly and pervious to water, the open ditches on each side of the road, even of a 66-feet wide road, are sufficient for draining the road-bed. If there be any springs under the road, a sub-drain leading directly to the side ditch will be required. Should the road be on a side hill a deep open ditch on its upper side, to arrest the flow from the adjacent land, may be sufficient, the water being at intervals conducted across and under the road by an ordinary stone culvert.

OUTLETS. Mistakes are often made by giving insufficient outfalls to the drains. Under the Ditches and Watercourses Act a municipality has the same power as an individual to enforce the natural outlet for the drainage water of the land. But municipal officers are apt to shrink from forcing an outlet through private lands, and to leave their road drains with insufficient outlets rather than incur the ill will of possibly influential constituents. This should not be so. Municipalities should insist upon their rights, and the owners of lands interfered with should pay the same proportion of the cost of the work as if only private individuals were concerned.

BAD DRAINAGE AND FROST. Imperfect drainage is the cause of the badness of our roads in nearly all cases. The inexperienced are not apt to appreciate the paramount necessity for the maintenance of a perfectly dry foundation of earth for their surface of broken stone, gravel, etc., to lie upon. A protracted rain will soften an undrained road and on the passing of a heavy load injurious ruts are the consequence. In these latitudes the soil water freezes and the consequent expansions and contractions quickly ruin a roadbed.

DESTRUCTIVENESS OF RUTS. It matters not whether a road be earth or macadam if attention is not given to the preservation of the finished crown. If ruts are allowed to form water is admitted. Every depression is a centre of destruction. The power of resistance to the water becomes less and less until the roadway becomes actually impassable.

ROAD MACHINES. In constructing earth roads a plow should not be used except where actually necessary, because a plowed surface is only with great difficulty made hard and smooth, and the plow is likely to cut too deeply into the earth. A good road machine should be procured if possible, for by the use of a machine the natural

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