MUNICIPAL DEPARTMENT

ROAD DRAINAGE *

Good drainage, and good roads, are, in effect, almost equivalent. A road that is built and maintained with a view to good drainage is almost certain to be a good road. If this is done, the road surface will be kept hard and smooth and sufficiently crowned, so that water will not lie on it in depressions or ruts, but will flow immediately to open drains at the side. These open drains will have a regular and constant fall to a free outlet. Further than this, the underflow, or subsoil water, will be removed, where necessary, by tile drainage. The method and extent of drainage must depend largely upon the character of the soil over which the road passes; clay, loam, gravel, sand, swampy, springs, flat, undulating, are all terms suggesting conditions that modify the plan of drainage.

Water should be disposed of in small quantities, along natural watercourses. If carried long distances and gathered in large bodies along the roadside, it gains force and headway, resulting in extensive wash-outs, and is in every way more costly to handle. It should be taken away from the roads as quickly as possible, for an excess of water is the great destroyer of roads.

The drainage usually found on existing roads consists of open ditches on each side of the graded portion, with a depth of about eighteen inches. They are frequently carried through rises of ground, past natural watercourses. Little attention is given to the regularity of the grade in the bottom, or to the amount of fall, as evidenced by the varying depths of stagnant water at wet seasons. The object of these drains was more to procure earth to raise the centre of the road above the water line than to lower the water.

A drain without an outlet is useless—or worse than useless. If there is not an outlet, the water is held in elongated ponds by the roadside, to soak into and soften the travelled roadway. This water is drawn up into the entire roadway by capillary attraction, just as a sponge will absorb water and hold it in all its pores.

The introduction of graders, wheeled scrapers and modern road machinery requires that a roadway should, in order to construct it economically without hard labor, be such as the implements will readily form. For this reason, deep, open ditches, with sharp angles and narrow bottoms, are not now suitable; but instead, a cross-section of road should show gentle curves, the rounded surface of the road not sharply defined from ditch. The latter should be about two feet wide in the bottom, where a wheeled scraper can work, and about eighteen inches in depth.

The best practice does not direct that the old open drains should be deepened for the purpose of draining the sub-soil. Deep, open drains are expensive, dangerous and unsightly, and the excavated earth generally does more harm than good to the road when used to round it up, especially if piled on top of gravel or stone. When the combined cost of construction and maintenance is considered, a tile drain laid under the bottom of open drains is cheaper and more serviceable.

It may be accepted as a general rule that roads tiled without gravel are better than roads gravelled without tile. All roads except those on pure sand can be improved by tile draining. A single line of tile, if placed about three feet below the bottom of the open drain, if the graded portion of the road is about twenty-four feet wide, will accomplish nearly all that tile drainage will do. If one side of the road is higher than the other, lay the tile on the high side so as to intercept the subsoil water as it flows down the slope. A four-inch tile meets most conditions, but the size will depend upon the length of the drain and the amount of water to be carried away. Care must be taken to give the tile a uniform grade, so that there will be no depressions. If possible, give a fall of at least three inches in one hundred feet. The cost will be about fifty cents a rod. The work, if properly done, will be a permanent and substantial improvement to the road, and will save many times the cost by lessening the amount of gravel needed on the road.

Municipalities need not undertake to at once underdrain all their roads in this manner, following the one rule. The preferable plan is to place these drains where

(Continued on page 12.)

* From the Annual Report of the Commissioner of Highways for Ontario.