

cross pieces mortised into them. On these cross pieces were placed poles four to six inches in diameter. In the larger culverts the logs were squared and held in position by end logs dovetailed into them at the ends, making a small angle with the longitudinal section of the road. Stringers were laid across and covered with planking. The planking generally used was rock elm three inches thick, twelve inches wide, and sixteen feet long. Some of these wooden structures have since been replaced by stone. The proper width for the waterway plus the thickness of the two side walls was taken out of the road. A wall of boulder stone, or, in some cases, rubble, eighteen inches thick, was then built, in nearly all cases without mortar, on a foundation usually level with the bottom of the waterway. This wall was built up within three inches of the level of the road surface, spaces being left for the insertion of three cross girders of wood flattened on the upper surface, on which was laid the plank, as tight as possible.

The defects of this condition of things are obvious. The superintendence of the work is placed in the hands of parties who have had no training or experience in the best methods of work, who have given the matter no attention or consideration, and, who are consequently unskilled and incompetent to make the best use of the time and money spent.

No good road of any kind can be made and kept without a proper system of drainage, and this fundamental fact is almost entirely neglected by pathmasters. In many places no side drains exist at all, and where they do exist they are always too shallow. In the wet weather of spring and autumn, the seasons in which the traffic is greatest, the road-bed becomes saturated and softened, and unable to support the covering. Heavy vehicles cut through the gravel, bringing up the primeval muck, and mixing it with the covering, permanently ruining the road where it occurs, and rendering reconstruction necessary in the following summer. In other places, where the covering is not broken, but sinks, deep ruts are formed, which are allowed to develop till road-work time comes round. The gravel on the road soon becomes beaten down in three parallel lines, two where the wheels run and one in the middle where single horses travel. These constitute three shallow trenches which retain the water, and allow it to saturate the road covering, rendering it soft and easily cut by wheels. The original road-bed is too narrow, the highest portion in the centre being only ten feet wide and between side drains twenty feet. The high ridge of clay and gravel is dangerous to turn off, and in some places it is impossible to do so. Too great depth of gravel is put on at one time, and it is a long time before it is possible to go over it with a heavy load. In this condition the traffic seeks the side of the road when possible, cutting it and bringing the clay on the gravel.

The gravel is taken from the nearest pit, with no regard to its quality, and always contains too much clay or large stone to make a good road. All kinds, from coarse sand to stones three inches in diameter, are thrown on, and left for the traffic to compact. The large stones are the worst, as they cause ruts on either side from the concussion of the wheel as it drops over them. It usually takes about three months of light traffic to put the roads in condition for the heavier traffic.

Wooden culverts are a constant source of danger, being generally in a state of ill-repair. The foundations are not put deep enough, and the