

## MUNICIPAL DEPARTMENT

### CONCRETE CULVERTS.\*

By A. W. CAMPBELL.

A great many townships throughout the Province have largely discarded timber as a material for small culverts and sluiceways. Cedar where obtainable has been most commonly used, but all varieties of suitable lumber are becoming scarce, and price is constantly increasing, and the quality now available is far from being equal to that of former years.

Those municipalities which have experimented with vitrified and concrete tile,

\*Paper read before the Engineering Society of the Toronto School of Practical Science.

have with very few exceptions been favorably impressed with the new materials. Failure and some dissatisfaction are occasionally reported, but this in every case can be traced to the causes not in any sense condemnatory to the new materials.

Excellent culvert pipe of concrete can be manufactured cheaply in any gravel pit under the immediate direction of the road overseer. The pipes are from two to four inches in thickness, according to diameter, which latter may safely and conveniently reach three feet, in lengths of two and one-half feet.

The implements required are of the simplest kind. The most important are two steel spring-cylinders, one to sit inside the other, leaving a space between the two equal to the thickness of the thinnest concrete pipe. By "spring-cylinder" it may be explained is meant such a cylinder as would be formed by rolling a steel plate into a tube without sealing the joint. With the smaller of these cylinders the edges

overlap or coil slightly; but are so manufactured that the edges may be forced back and set into a perfect cylinder. Accompany these moulds are bottom and top rings, which shape the bell and spigot ends of the pipe.

The two cylinders with joints flush are set on end, the one centrally inside the other and on the bottom ring, which in turn rests on a firm board base. The concrete, made of first-class cement and well-sifted gravel, in the proportion of one of cement to three of gravel, is then tamped firmly but lightly into the space or mould between the two cylinders. The tamping-iron used to press the concrete into place is so shaped as to fit closely to the cylinders.

The concrete is allowed to stand in the mould for a short time, when the cylinders are removed; the outer and larger cylinder by inserting an iron wedge into the joint and forcing the edges apart; the inner cylinder by inserting the wedge into

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