

different Districts, taking charge of the administration in their respective Districts.

Modern road machinery, including graders, crushers and rollers are employed. Stone and gravel are being used and about \$75,000 will this year be expended.

With the excellent condition of the roads in this very rich County, in a few years, following the improvement that is now going on, this county will serve as an object lesson in Good Roads.

Fortunately for Simcoe, material is quite easily available, and gravel of an excellent quality is to be found in abundance. So plentiful is this material, that good gravel roads are this year being built at a cost of from \$300 upwards. This gravel is of such good quality that the Simcoe council considering the matter of cost, are using it in preference to stone on the greatest part of their work.

Construction and Maintenance of Culverts

The question of what material should be used in the construction and maintenance of small culverts, is a question that is agitating the minds of municipal councillors considerably, at the present time. The high price of timber and lumber and the low grade of this material, which is now being delivered for such purposes, has almost compelled us to look for something more substantial, even if the initial expense is somewhat greater.

The very heavy draught upon the municipal funds of the ordinary township, for culvert repairs and renewals, where wood is being used, has absorbed so much of our available cash that little of this fund has been left for actual road improvement.

Concrete pipes are now being manufactured pretty largely by the councils where gravel or broken stone is to be found within reasonable distance.

Some little trouble was experienced in obtaining a knowledge of how this work should be done, owing to the fact that few experienced in the manipulation of concrete were to be found among the mechanics of the day. This work, however, has gone beyond the experimental stage and now is being pretty generally adopted.

We have not, however, made so much progress in using concrete for the larger culverts. Where circular pipes do not afford sufficient capacity to carry the water from such channel, concrete arches have been adopted successfully in some instances, but an arch requiring a little additional skill, makes it a more sensitive undertaking. Up to a certain span including all openings of not more than six foot width, with the proportionate wall, customary batter, and a flat top, can be more easily constructed, will give equally good service, and can be made for less cost than an arch.

Care, however, should be exercised in seeing that the proper materials be used, and that care should be taken in the

mixing and laying of these materials. Should it be necessary to extend the side walls to a greater depth to a secure foundation, they should have a top width of twelve inches and a frost batter of two inches to each foot, and the footing of the wall should project six inches beyond the bottom.

Where the excavation furnishes more material than is required for the embankments, and surplus earth should be used to increase the width of the embankment.

The side walls should be erected within a substantial and well constructed framework of well fitted lumber, closely boarded up against the work as it proceeds. Care should be taken to make a clear, smooth, regular surface so that moisture will not find lodgement. The concrete should be thoroughly rammed into place so that all surfaces shall be smooth. The framework should not be removed in less than ten days from the completion of the work.

A temporary framework should be erected to support the concrete flooring while it is in process of construction. This framework should be firm and substantial of dressed lumber. Upon this framework should first be placed a sufficient layer of fine concrete. Across this should be spread ordinary barbed wire about four inches apart, woven around, nails or spikes driven into the false work, upon this there should then be laid the remainder of the concrete.

The barbed wire is used to reinforce the concrete and prevent sagging. It is now being very commonly used in preference to other materials, answering the purpose in certain small works and being less expensive. The concrete used in side and wing walls should be composed of gravel and Portland cement, mixed in the proportion of one part of cement to six parts of gravel, and that used for the cover stone should be in the proportion of one of cement to five of fine gravel.

The cement should be mixed on a platform placed close to the work by first spreading evenly a layer of gravel, upon this shall be spread a proportionate quantity of cement, and the two should be thoroughly intermixed in a dry state. To this should be added sufficient clean water to bring the mixture to a consistency of a stiff mortar.

Care should be taken to see that the gravel does not contain an excessive amount of sand, loam, or large stones, if such is the gravel's composition, it should be screened to remove the sand and earthy matter, and also the large stones, then the screened gravel and good clean sand should be mixed in the proportion above specified.

If the cover stone of the culvert should be on a plane with the surface of the roadway, the upper $1\frac{1}{2}$ inches of the stone cover should be composed of equal parts of cement and sand, laid in a separate layer over the concrete bed.

Orillia's Power Plant.

The September issue of The Canadian Engineer and Electrical Science Review has an article on "Orillia Power Development," which is a strong argument in favor of civic ownership. More than twenty years ago a private company built waterworks, which were taken over by the town in 1883. In 1887 electric lighting was introduced. The waterworks and electric light were operated by steam power till the electric power plant now in successful operation was installed.

The Canadian Engineer then tells of the harnessing of the Ragged Rapids on the Severn, nineteen and one-half miles from Orillia, at a cost of \$75,000, by which it was expected 800 horse power would be developed, but the tail race was defective and that amount of power was not available. The revenue derived from the various services operated by electricity is: Water, \$5,000; light, \$9,700; power \$6,537; total, \$21,237. The cost of running the works, with repairs, is about \$7,500, adding to which the interest on the investment, leaves a profit of from \$600 to \$1,000 on present capacity. In addition the town has its street and municipal building lights free. The flat rate for residences is 25c. per month for each 16 candle-power lamp; for stores, hotels, halls and churches 35c. per month. When ten or more lamps are installed the current is supplied on a meter basis at the rate of 13c. per thousand watts.

On all these there is a discount of 20 per cent for payment within ten days of presentation of the bill. Fifteen cents a month is the rental charge for the meter. The charge for power is \$15 per horse-power per annum.—*Ex.*

A by-law confirming an agreement entered into by the town council with the Dominion Linen Mills Co. for the establishment of a large linen mill, and kindred industries in Orillia was carried recently by a vote of 558 to 14. An Exchange says: "This is the first of the concerns to be attracted to Orillia from a distance by the cheap electric power offered by the municipality from its plant at Ragged Rapids, but negotiations are under way with others."

From a newspaper report of its proceedings we observe that the council of a certain western township recently passed a resolution directing the placing of the collector's roll in the hands of the collector on or before the 24th of September 1903. The statutory time for the performance of this duty by the clerk is the 1st October in each year, or such other day as may be prescribed by by-law of the local municipality. (See the latter part of section 131 of the Assessment Act). If the council desires to legally effect the change mentioned, it should pass a BY-LAW for the purpose. A RESOLUTION is not sufficient.