

frequently termed "artificial stone" and sometimes "granolithic."

Bridges are built of timber, iron, steel, masonry and concrete in many different forms; while culverts are constructed of timber, stone, concrete-pipe, iron, concrete and of vitrified clay (sewer pipe), while the designs are numerous.

Drainage is of various classes and for various purposes. There are drains constructed under the Ditches and Watercourses Act and under the Municipal Drainage Act. There are open drains and tile drains; ordinary farm drainage, swamp drainage, road drainage; drainage accomplished by gravity alone, while in other cases pumping machinery is required.

Municipal buildings demand a widely-ranging share of attention, but they include court houses, jails, county offices, houses of industry, town and city halls, fire halls, police stations, waterworks stations and other buildings.

A waterworks system is an intricate affair, involving in first construction a study of the source of water supply, an examination into the methods of purification, a knowledge of pumping machinery, and methods of distribution, water-pipe and mains, hydrants, standpipes and many other details.

Sewerage is equally important and the research required is almost illimitable with regard to the best design of a system. Brick and ordinary sewer pipe are the materials of underground construction. But added to this is the question of sewer ventilation, of house connections and plumbing, of man-holes and flush tanks. The sewage collected must also be disposed of at the sewer's outlet. Of this there are various systems—broad irrigation, filter beds, chemical treatments, septic tanks; and the common method, but one which is not always popular, and is becoming less so, the discharge into a running stream, diluting the sewage, but polluting and poisoning the water.

Street lighting is a matter of many details relating to electricity and gas. These two means constitute the choice now generally accepted, the former, however, having almost displaced the use of gas. Electric lighting is of two descriptions, arc and incandescent, the former being that generally adopted for street lighting and the latter for house use. Clusters of incandescent lights, however, have received much favor for street purposes, and there is an advantage in having the one system for all purposes.

Electric railways are entering more and more into the domain of municipal works. If not constructed as such, they are at least a public service which, using the public thoroughfares, must be surrounded with certain restrictions as to the class of roadway laid down, the electric circuit, the class of cars and service given.

Other matters to be classed under municipal works are street cleaning, garbage collection and disposal, and fire protection. Added to all these are questions of ownership, assessment, taxation

and financial management. Many minor details have been omitted which will suggest themselves to those experienced in municipal government; and it is to all of these that THE MUNICIPAL WORLD will address itself during the new year upon which we have entered.

Wasted Labor.

The inefficiency of statute labor has been described in many ways and from many standpoints. It is not all included, however, in the simple waste of labor itself, but, added to this, is the money expenditure of each township, which, spent on the statute labor basis, is like the labor scattered, misapplied and unproductive of durable results. Then again, the waste on roads is reactive, for bad roads themselves create a loss to the farmer.

Apart from the waste of money, and the loss from bad roads, the following is an interesting estimate of wasted labor, prepared by J. C. Crow, clerk of the township of Pelham, and used by him in a public debate, to prove that the present method of performing statute labor in Pelham is a failure.

The ninety-six road lists sent out in the spring of 1896 had on them to be performed, 3429 days, viz., on land, 3272 days; farmers' sons, 50 days; householders, 46 days; manhood franchise voters, 61. Added to this, unperformed work brought forward from the lists of 1895, besides 25 days for 1895 put in collector's roll, 57 days, making a total to be performed in year 1896 of 3,486 days.

Wasted—Of the 1895 back work, because the persons refused to put it in 1896, 24 days.

Wasted—Of the 1896 work: On land, 156 days; householders and farmers' sons, 15 days; M. F. voters, 10 days; or a total of 181 days, for such reasons as, pathmasters neglected to work roads, or did not return lists, or parties claimed to be under age, or to be volunteers, or were liable for work in other municipalities, or were gone, etc., etc. Total of this waste 205 days. Leaving actual work supposed to be performed 3,281 days.

Wasted—Time spent by 96 pathmasters attending clerk's office to qualify for office, and in making return to clerk in fall, and also in warning hands to work, say one day each, or 96 days.

Wasted—Time of 96 pathmasters as bosses, at say 2 days each, 192 days.

Wasted—5%, because some people come to work too late and quit too early, or perhaps don't come at all, 5% of 3,281 is 164 days.

Wasted—5%, undoing what was done by others in former years, 164 days.

Wasted—10%, for want of suitable implements, tools, team, harness, vehicles, etc., old plows, wagons, scrapers, harness, rails for sideboards, etc., etc., 328 days.

Wasted—33⅓%, because neither path-

masters or people know how to properly make good permanent roads, and worse, too many look upon doing roadwork as an annual holiday, 1094 days. (An old councillor says this waste might be doubled.)

For example, some pathmasters refuse to subscribe the necessary declarations when getting or returning road lists. But few know how to operate road machines which seem to have no brains, horses too light or green to handle machine, and the road beats are so short, (average 1½ miles) that road machines cannot be used to advantage.

Sand and loam load easier than gravel, hence are hauled on roads, and generally there are either too few teams or too few shovellers. Roads are not worked uniformly, generally far too wide; some pathmasters work at wrong season of the year, and some are charged with working along their own premises too much. Delinquents are not prosecuted by pathmasters, as they do not care to make enemies of neighbors. Thus we have a total waste of 2,038 days.

Thus we have a total waste of 2,078 days.

And have left actual time honestly put in (at 8 hours per day), 1,234 days.

Wasted—20% of this, or the difference between an 8-hour and 10-hour day, 249 days leaving number of 10-hour days honestly performed, 994; which, paid for at the fair price of \$1.00 per day, would have cost \$994.00.

The total time on the lists when sent out, 3,486 days, commuted at thirty cents (30¢) per day ($3,486 \times 30 = \$1,045.80$), would have produced enough cash to have paid for all the actual work done, and have left a balance to good of over \$50.

Cold Storage.

The announcement recently made by the Ontario Government that it is part of their policy to encourage the establishment of cold storage stations throughout the Province, is one that should attract a large and favorable share of public attention. In what manner it is proposed, to do this, has not been stated, but whatever the plan may be, the matter is one with which municipal councillors should become familiar, as the results will doubtless be of importance in a number of ways.

The present difficulties in dealing with perishable farm produce are many, are not soon enumerated, and they operate most unfortunately with regard to both the producer and consumer. Any system of cold storage which will obviate the misfortunes of glutted markets, difficult sales and attendant unprofitable prices in fruit such as peaches, strawberries, plums, pears, tomatoes; in poultry, in butter, in eggs, and all small stuffs, will be welcomed by the Ontario farmer. That there are immense possibilities in all these products there is every reason to believe, both for the home and foreign market. But the farmer's past experience with