

MUNICIPAL DEPARTMENT

BRICK PAVING FOR COUNTRY ROADS.

Capt. W. S. Williams, at the seventeenth annual convention of the Ohio Tile, Brick and Drainage Association, read a paper strongly advocating brick paving for country highways, says the Clay Record. After giving his experience with a stone road extending from Fremont, Ohio, to Fort Crogan on the Sandusky river, he described the brick roads of the Netherlands, and finds the stone road far inferior to those famous highways. The stone road named has better gradients for its length, perhaps, than any in this or any other country. The road-bed proper was thrown up about three feet in height. A very thick coating of broken stone was then placed upon the road, excepting that part between Fremont and Bellevue, which was constructed mostly of gravel. Numerous toll gates were established as a means of revenue for repairs of the road. Having charge of this road for a number of years as state engineer, Mr. Williams asserts that it did not wear well; that it would cut into numerous ruts, when wet; and that, in dry weather, the wheels would pulverize the stone, which would be blown away in the form of dust. The rough broken stone was objectionable, until worn smooth; moreover, the road was a very expensive one to keep in order, the revenues scarcely sufficing for the purpose.

The brick paving of the highways of the Netherlands was done so long ago that there are very few of the present generation who know when it was done. The material used was brick, but not as good as our best quality of shale. The repairs are very small: one man will keep several miles of this pavement in good order. It is apparent from experiments with different kinds of paved roadways that brick is the smoothest, most lasting, the cheapest, and the best.

In any part of the country the alluvial formation of mixed gravel, sand, and sandy loam is sufficient for a foundation. Sometimes it may be necessary to add more sand or gravel, if convenient. Cinders, or anything which water can pass through readily, will do just as well as broken stone—anything that will drain and not hold water, such as clay or its equivalents.

It has never been found essential to put broken stone under cobble-stone pavement, and a brick has certainly more square inches of bearing surface on the foundation than the average cobble-stone. Neither is it necessary to fill the interstices between the brick with coal tar, as it is plainly evident that brick will shed water more rapidly than cobble-stone, and coal tar is never used in a cobble pave-

ment. The brick with a plain sand filler, or its equivalent, will soon form a cement around and under the brick that will be impervious to water, and will become tough and hard.

The road bed should be thrown up with sufficient crown to shed water nicely, and then rolled with a heavy roller—the heavier, the better. The ramming and pounding should be done on the foundation, and not on top of the brick.

A dirt or summer road adjacent to the paved way should always be maintained. The paving brick should contain a large percentage of iron well distributed throughout the mass, and where this condition exists, the brick will be found to be a homogeneous fused mass of great strength. A light colored brick shows the absence of iron. It is not necessary to have them repressed. As the repressing produces two different structures in the same brick, there will not be the same cohesive strength from centre to exterior. The plain, ordinary standard-sized brick is the best.

HALIFAX PUBLIC WORKS.

The following particulars of public works construction in Halifax are taken from the annual report of the City Engineer for 1894-95:

SEWERS.

The total length of new sewers constructed was 17,509 feet, or 3.31 miles. The average cost was \$3.53 per lineal foot. The most expensive work was on Proctor's Lane and Brunswick street. The extra cost was caused by the character of the rock and depth of excavation. The cheapest work was on George street, from Water street to Hollis street. The sewer assessment amounts to 57 per cent. of the cost of work performed. The outfall at Marine and Fisheries Wharf was extended on a plan similar to that adopted at Prince street and DeWolf's Wharf. An automatic flush tank was placed at the end of the sewer in the north block of Hollis street, and similar flush tanks should be constructed at the upper end of all dead ends on flat grades. The effect of the improvement at the Esplanade is more noticeable, and few, if any, complaints have been made respecting it.

Complete plans and records have been made of all sewers constructed under the Act to date. They show the location of sewers, drains, manholes, etc., with size, depth, grade, length and all other information required.

PERMANENT PAVEMENT.

The work performed includes 1,213.5 square yards of concrete sidewalk, 2,268.3 square yards of asphalt sidewalk, 4,906 ft. 10 inches of straight curb and 505 ft. 7 in. of circular curb set or reset, and 5,538 ft. 6 in. of straight gutter and 534 ft. 3 in. of circular gutter laid or relaid.

The cost of concrete sidewalks averaged \$1.83 per square yard, a saving of ten cents per yard compared with last year. The cheapest work was done for \$1.69 per yard and the highest \$1.94, one cent above last year's average cost. An improvement was made in the corners by

grooving the surface to give a foothold.

An asphalt sidewalk was laid on the north side of Spring Garden road. It was laid under difficulties. The season was late and the weather bad. We were obliged to pay a big price for asphalt and purchase tools and plant. Notwithstanding the disadvantages the cost was only 70 cents per square yard. The work was not as satisfactory as we would desire, but the experience will be valuable in future work.

Concrete is the most suitable permanent material for sidewalks on level streets. In the construction of flag stone sidewalks, each flag should be large enough to cover the full width of the sidewalk in order to make permanent and satisfactory work that will resist the action of frost, etc. This brings the cost up above that of concrete. Brick, if laid so that it will stand frost, costs as much as concrete and is not so popular among pedestrians. In winter the porous bricks absorb so much water that they are icy and slippery in freezing weather—quite as much so as concrete, although not so noticeable in consequence of the greater number of joints. They are also wet and disagreeable during thaws, and do not dry as rapidly as concrete. They wear unevenly, forming hollows or basins that hold water difficult to avoid on dark wet nights.

Asphalt, however, seems to be most satisfactory for hills and less important streets. While it is not permanent the cost will be not much more than one-third the cost of concrete. It must therefore be more generally used, as our means are limited.

In many cities this work is done under a "Local Improvement Act." The proprietors representing a majority in value petition the Council to lay a certain specified pavement on a certain street; the city, after determining the life of the pavement, use it as a basis to determine the time in which a loan necessary for the work will mature and assess the proprietors such per centage per annum as will cover principal and interest. No pavement is allowed unless approved of by the City Engineer, and in the case of street pavement, when a choice has been made for a portion of the street and proves successful, no other kind is allowed on the continuation of the street when the balance of the proprietors petition for it.

Mr. Wm. Russell, C. E., of Port Arthur, Ont., is dead.

Mr. W. J. Valleau, secretary of the Chatham City Waterworks Company, has resigned his position, and will devote his time to waterworks construction business, with a company of which he is a member.

Vancouver, B. C., has 22 miles of sewers and 60 flush tanks. In 1895 \$63,898.09 was spent in improvements. There are 68 miles of sidewalk, 13 miles of surface drains, two miles of base drains, 15 miles of graded lanes, 75 miles of graded streets, 11 miles of gravelled streets, 20 miles of macadamized streets, and 2 miles of bituminous rock paved streets.