# MUNICIPAL DEPARTMENT

## THE CONSTRUCTION OF STREET PAVEMENTS.

Mr. A. W. Campbell, Provincial Instructor in Road Making for Ontario, recently presented a very valuable report to the city of St. John, N. B., from which the following extracts are taken:

### STONE BLOCK PAVEMENTS.

Stone block is the oldest of paving materials; is extensively used in cities, and is the strongest and most durable that can be had. It is well adapted to grades up to ten per cent., yields little dust, requires little repair and suits all classes of traffic. It is, however, very noisy and is rather rough. It is therefore not suited to residence streets nor business streets on which there are retail stores and offices. It is best adapted to streets such as Water street, on which there is a large amount of slow, heavy traffic. It should be used also on steep grades in place of asphalt.

The stone generally used is granite or trap. Excessively hard stone wears to a smooth surface and becomes slippery. No examination or test which can be made of stone is perfectly satisfactory in distinguishing the best variety. Different kinds of the same stone and even stone taken from different parts of the same quarry, have different wearing qualities. The trap rocks of Carleton Heights or the quartz diorites at the end of Sandy Point, will prove satisfactory. Quartzites, of which varieties are found at the west of Lily lake, on the slope of the ridge north of Douglas avenue and on the road to the lake after passing Seely street, are apt to wear away too rapidly. White marble, of which some is found back of Lily lake and elsewhere in the vicinity, is too soft.

The stone blocks should be cut into rectangular blocks about seven inches deep, three inches wide and nine inches long. The price paid for quarrying and making these blocks will average about thirty dollars per thousand. Slabs of a kind which can be handled by one man are split out in the usual manner. These are sub-divided into sections corresponding to the size of paving blocks, which are then trimmed and finished.

In constructing a stone block pavement the natural earth is first prepared by draining, grading and rolling with a steam roller. On this a layer of concrete is laid, say six or eight inches in thickness, according to the traffic to be supported. On this is spread a layer of sand about one inch in thickness, and in this the stone blocks are embedded.

The blocks are laid stone to stone in courses at right angles to the street line and so that the joints will be broken. A slight variation in the size of the blocks is permissable as regards depth and length, but the width (if three inches as previously specified) should be exact.

On hills and grades a better foothold for horses may be obtained by using rough-finished blocks, or the blocks may be so embedded in the layer of sand on a slight incline in such a way as to present a series of steps. At street intersections the blocks are laid obliquely in what is termed the "herring bone" fashion so as to give a sure foothold to horses turning the corners. The joints between the blocks are *filled with sand and tar cement.*

The State of Maine, adjoining New Brunswick, is one of the largest producers of stone paving blocks.

### ASPHALT.

The materials of which asphalt pavements are composed may be either natural or artificial. Natural asphalt is obtained by grinding to powder bituminous limestones found in Texas, Utah and elsewhere, or the bituminous sandstones found in California, Kentucky, Texas, etc. This powder is then heated until soft, and is spread while hot on the roadway. The chief source of artificial asphalt is the Island of Trinidad, W.I., where crude asphaltum is obtained, is then refined and mixed with sand and stone dust; is heated and applied to the roadway.

Owing to the skilled labor and machinery needed in laying this pavement it is, in the great majority of case laid and kept in repair by contract. When properly laid its durability cannot be questioned, but there is some difficulty in surrounding a contract with such safeguards as will insure first-class material and workmanship. A reliable company should be employed and the maintenance of the pavement guaranteed for ten or fifteen years. A common guarantee is for a term of five years, but this is not sufficient. Breaks in asphalt pavement must be immediately repaired, otherwise they quickly shear off under wheels, and the size of the hole increases with great rapidity.

On the business streets of St. John, where the traffic is severe, where noise is objectionable, and where smoothness, cleanness, ease of travelling, are desirable, stone blocks are not suitable. Asphalt is the most durable material filling these conditions. It is not, however, suitable for steep grades, and stone blocks would necessarily be retained for grades greater than three per cent. Nor should asphalt be used between and adjacent to street car tracks. The gutters, too, should be formed of concrete or flagstone, as asphalt decays rapidly from the effect of moisture.

### VITRIFIED BRICK.

Vitrified brick for street paving are different in compcsition and manufacture from the ordinary building brick. They are made from shale, or clay, or a mixture of the two, which is heated to the point of vitrification and then slowly and gradually cooled. The size of each brick is about $2\frac{1}{2} \times 4 \times 8\frac{1}{2}$ inches. They are laid in the same manner as stone blocks, viz., in courses at right angles to the direction of the street, with broken joints, etc. The durability is not equal to that of asphalt or stone blocks. But they are less noisy than stone blocks. The pavement is adapted to business or residential streets on which the qualities, but not the strength, of asphalt are required. They are manufactured in the province of Ontario, in the States of Ohio, New York, and Pennsylvania and elsewhere. There is room for much variation in the quality of brick. The process of manufacture is one which requires an extensive plant and much skill in burning. The composition of clay or shale used is of great importance. It may contain, for example, too much lime, which will destroy the brick on exposure to moisture. Care must therefore be taken in selecting the brick to be used.

### WOOD PAVEMENTS.

Cedar blocks and pine pavements have been used in St. John to some extent. In Canada and the United States wooden pavements are very much in disrepute. They have been found to decay rapidly, settle unevenly, become rough and unsanitary, absorbing filth and giving off bad odors. Much of this is unquestionably due to the methods of constructing these wooden pavements in this country.

In England and France they are regarded with favor, but the timber used there is carefully selected, so as to exclude any blocks showing signs of decay. Oblong blocks are cut all of equal size. They are treated with creosote, tar, and other preservatives, and are laid on concrete foundations. Some soft woods are used, and the life of such pavements is about ten years. The best wooden pavements are made, however, from Australian hardwoods, particularly the jarrah, karri and other of the eucalyptus woods of South Australia.

In the absence of actual experience in this climate with wooden pavements constructed in the careful manner outlined in the foregoing paragraph, their use cannot be recommended. Certainly cedar block and pine pavements as commonly laid in this country are not a success and should not be tolerated.

(To be Continued)