4,236,838,000 gal. of water was used for locomotives alone, of which 1,751,790,000 gal. is purchased from municipal and privately-owned waterworks plants and 138,645,000 gal. is treated by purifying plants owned by the railroad. It is necessary to maintain 123 water stations to distribute this water to locomotives. In addition to the above, the washing and filling of locomotive boilers at terminals requires approximately 950,000,000 gal. per annum, which is provided by the same pumping plants with additional facilities for maintaining the desired pressure for washing the boilers and the necessary pipe line for the distribution of this water under pressure.

Stationary power plants also require approximately 300,-000,000 gal. per annum, including water used for condensing engines, of which 125,000,000 gal. is city water. It is estimated that 250,000,000 gal. additional is required for miscellaneous purposes at shops, roundhouses, offices and stations. This makes a grand total of 5,736,838,000 gal. of water used for all purposes by this one road in Illinois alone.

CITY PAVEMENTS.

By C. C. Powell.*

For the benefit of those readers who were not tortunate enough to be able to attend the recently held annual meeting of the Ontario Good Roads Association, we publish the following abstract of the paper presented by Mr. Powell before it.

During my experience in Toronto I have found that the people are, as a whole, greatly interested in the question of pavements, and will generally take the initiative in this matter; in fact, demands for pavements are often made by property owners before the sewers are constructed, and during a period of great real estate activity the requests for pavements of one kind or another are so great as to tax the best efforts of the Works Department to keep up with them.

The pavement work of Toronto is all carried out on the local improvement plan:

1. On petition.

2. On the initiative or without petition.

3. On the initiative by 3/3-vote of council.

1. When a work is undertaken on petition, the requirements are as follows :-- A petition form must be obtained from the Works Department giving the description of the street to be paved, width of pavement, cost per foot frontage, annual cost per foot frontage for the life of the pavement, and in order that the people to whom this petition is presented may have an opportunity of knowing the cost of any other pavement, a table of these costs is printed upon the petition form. This precaution is taken so that a person signing a petition can not plead ignorance or misrepresentation in regard to the price to be paid. Such a petition is considered sufficiently signed when it bears the signatures of sixty-six per cent. of the property owners, representing fifty per cent. of the property value.

When a petition is presented and declared to be sufficiently signed a recommendation is made to the council, and if passed by that body the work may be proceeded with.

2. If a work is deemed necessary by the Works Commissioner a recommendation is made on the initiative. When this recommendation passes council, notices are sent to the property owners, and a month is allowed for the owners to petition against the improvement. If no petition is received within this period, the work may be proceeded with. A petition against, to be sufficiently signed, must have the signa-

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tures of a majority of the property owners, representing at least half the property value.

3. In cases where trouble is experienced in getting a local improvement laid and where such an improvement is deemed mecessary by the Works Commissioner, as being in the public interest, a recommendation is made, and if passed by a two-thirds vote of council the work may be proceeded with, motwithstanding any objections or petition against by the property owners.

With machinery as outlined above, a municipality is well equipped for carrying out any campaign for street improvements that may be decided upon.

The question of the selection of a pavement for a given street is often a difficult one where there are so many kinds to choose from, but, generally speaking, the elements that enter into this selection are :--

1st. Durability, having regard to the traffic to be expected after paving.

2nd. Grade.

3rd. Cleanliness.

4th. Cost.

Permanent pavements are now generally recognized as being best for the more or less heavy traffic to be encountered in a city, and practically no other pavements are being constructed in Toronto. Permanent pavements are generally defined as those having a concrete foundation, and the practice has been to vary the depth of concrete foundation according to the traffic. These depths vary as follows :-

4" for light traffic ..

5" for medium traffic.

6" for heavy traffic.

The so-called permanent pavements are divided as follows :--

1. Sheet pavements.

2. Sectional pavements.

3. Monolithic pavements.

Under sheet pavements are included asphalt, asphaltic concrete, tar concrete, bitulithic, and a number of other patented bituminous pavements.

Sectional pavements comprise brick, stone setts, wooden block and asphalt block.

Monolithic pavements include the various forms of concrete pavements and probably asphalt macadam and tar mac adam can be included in this list.

For our guidance in selecting a pavement for a given street, the following table has been made, viz :--

From 3% to 5% Brick, stone sett, asphalt macadam, Up to 3% grade Any pavement. asphaltic concrete, concrete mac adam, rocmac, bitulithic, asphalt From 5% to 7% Brick, stone sett, macadam, rocmac block.

Above 7% Macadam and rocmac.

For heavy traffic the pavement most in use in Toronto is asphalt, although brick and wooden block have been laid in a number of cases.

The merits of the brick pavement are apparently not very highly appreciated in this city, as almost invariably our recommendations for a pavement of this material are petitioned against, the only reason given being the noise. The repair bill on our brick pavements is much smaller for the same area than for any other pavement.

In the residential districts asphalt, and bitulithic are about the only two pavements laid, although it is expected that asphaltic concrete parts laid, although it is expected that asphaltic concrete, asphalt macadam, or rocmac will be laid in increasing quantities as time goes on.

A patented pavement is not recommended unless a suf-ntly signed netition has been a ficiently signed petition has been received asking for such a