

on the old prices, and the means of doing so will be discussed later. Meanwhile, the writer would emphasize the importance of making each scheme part of a town-planning scheme, and avoiding the isolation which has been the bane of private estate work in the past.

Next, and probably the most attractive subject, is the flood of new works which has been held up by the war, all of which works have earnest advocates, each of whom is anxious that his pet scheme shall have preference over all others. If a small proportion of the Hull schemes materialize the writer will have an interesting time, and there will be good material for another visit of the institution. It remains to be seen how far the financial condition of the country will allow the schemes to materialize.

Use of Machinery

The third problem, and that to which I wish to direct the special attention of members, is that of bringing the cost of routine work and also that of street and sewer construction to such a figure as can be covered by a not intolerable increase of the rates. With average weekly wages doubled, cost of materials more than doubled, and assessments stationary, it is difficult to see how the doubling of rates can be avoided, and it might be said that the ratepayer has no right to expect it, but he is at any rate entitled to an effort.

The first cost to be attacked is that of labor. The old class of navvy and horseman, who was recruited from the country, has almost disappeared from the towns, and most of those who are in the towns can find easier and better-paid employment than that offered by a municipal body. The townsman has an inferior capacity for heavy work and a very strong prejudice against it. The obvious policy, therefore, is by some means to cut out the heavy work and endeavor to staff public works with men who will use their heads. A simple example is the use of scarifiers to break up macadam roads. Formerly these were not used in Hull because they would displace labor. Now they have to be used, because pick-work is unpopular. If all increase of costs could be met as easily as this there would be no scope for a discussion.

Problems in Mechanical Loading

In view of the urgency of housing work and the shortage of navvies, the writer has looked into the question of using trenching machines for the sewer and gas, etc., trenches in the new streets. At the time of writing the economy of such a machine for the amount of work required at Hull is doubtful. One cannot properly adopt the usual practice of debiting the work with a percentage for interest and depreciation, but must charge the whole cost of the machine to the rush of work for which it is purchased. Before this paper is read no doubt some additional light will be thrown by Mr. Collins' paper at the general meeting.

A much simpler proposition is a tamping machine. The first cost is comparatively small, and not only should there be a saving in working expenses, but there should be an efficiency which was lamentably wanting in hand-work.

The loading of vehicles is work which cries out loudly for mechanical assistance. Costly vehicles are kept standing when they might be running, and good horsemen and motormen are lost because, being good, they can obtain work in connection with mills, etc., where they do not have to handle their loads. The writer has been able to obtain the use of high-level coal cells, and to obtain delivery of a certain amount of road metal and fuel in hopper wagons, which is an admirable solution so far as it goes. Some material landed at wharves by crane can be taken direct to its destination, but there remains a great deal which has to be picked up in the yard and elsewhere. There are some inexpensive mechanical loaders which deal well with dry macadam, gravel, etc.; but tarred material is a problem, and destructor clinker is even more unpopular with the man, and there is more of it. The average cost per ton is probably four times what it was ten years ago.

Improved Road Surfaces

In street cleansing most engineers, no doubt, find that they are already reaping the benefit of past work in improving road surfaces and in tar-spraying. Where a reasonably hard stone has been used, even an untreated water-bound

macadam road which has been repaired several times by steam rolling, has a much lower dirt-producing capacity than the old roads of the writer's early days. The partial disappearance of the horse has effected some relief, and for about fifty weeks in the year the only scope for economy seems to lie in substituting single-handed work for gang work in all but the principal streets. During the dirty weather in late winter good use can be made of a picking-up machine, but it must be an inexpensive machine which can be attached to another vehicle. The writer has used Whittome's machine with satisfaction for some years.

Most engineers probably have to continue to use the motive power already at their disposal. In a fairly level town, and for miscellaneous work, there is not a great deal to choose between various types, and the capital cost of mechanical vehicles is a deterrent to their use at the present time. Given plenty of heavy work and suitable loading facilities, steam is by far the most economical. During the war, when the writer was hard pressed for both horse and mechanical drivers, an electric rully was ordered with the idea of employing a man of the navy type to drive it. A permit was obtained after the armistice, but at the time of writing the rully is not delivered.

Economies in Material

The writer would like to elicit opinions as to economies in material. Most towns have their particular extravagances and parsimonies. In Hull natural flags have generally been used. There seems to be no justification for continuing to buy them when highly satisfactory artificial flags can be laid at half the price. Wood-paving blocks, where large areas have to be relaid, might be reduced in depth to 3 ins. There are purposes for which concrete can replace other materials, but with cement at the present price the number of purposes is reduced.

The cost of refuse destruction has for long been somewhat of a bugbear to the writer. During the war not only has the cost of wages more than doubled, but the character of the refuse has changed, its calorific value having become almost *nil*, and the so-called clinker increased to about 50 per cent. of the original weight.

In the interest of allotment-holders the corporation was allowed to establish an experimental pulverizing plant which had been held over from the outbreak of war. It is too early to give financial results, but it is safe to say that the cost of treatment is less than burning, and there is no clinker problem; but the small plant dealing with about one-fifth of the refuse easily supplies the present demand for the manure. Such a plant really should be a destructor, as a great deal of large stuff has to be thrown out, especially during "spring cleaning," and has to be destroyed by other means.

If the demand for the manure increases the writer proposes to install a screen at one of the destructors and screen out the small stuff for manure, in the expectation that he will thus get rid of a great deal of the inert matter and obtain better furnace results from the remainder. Meanwhile, he is encouraging the health department, who collect the refuse, to dispose of as much as possible by tipping, and he has no hesitation in defending the practice.

Established Services Severely Treated

It is not to be hoped that any alterations of practice will bring expenditure appreciably nearer its old level, but it is a usual experience that councils handle the estimates for established services much more severely than those for new schemes and new departments. In the hope that the exchange of ideas will enable members to maintain the efficiency of their works in spite of this tendency, the writer has put together his notes with the feeling that their value depends on the extent to which they elicit the ideas of others.

Approximately 1,200 houses have been built this year or are now being erected in Ontario under the provisions of the Act granting loans to home-builders. In Ottawa, 120 houses, valued at more than \$400,000, are under construction; in Oshawa, 34 houses; in Windsor, 65 houses; and similar renewed activity is being indicated in many other cities.