

unsuitability for any road not having a flat gradient. Nearly half the street mileage of Holborn is laid with asphalt and a considerable length in Westminster. When the weather is either very wet or very dry, asphalt is at its best, but there are times when the atmospheric conditions are such that horses seem to lose all control over their legs. In the case of this material, more perhaps than in any other, scrupulous cleanliness is necessary, and with its impervious smooth surface this is easily effected with an abundance of water and the squeegee; always provided that the newly washed surface does not freeze; if so, there is trouble.

A street laid with wood, when the joints have been reduced in thickness to a minimum, presents, when new, a surface easily swept and washed, but it must be conceded that by its very nature absorption must take place and that much more in the case of soft woods than in that of the harder timbers, such as Jarrah and Karri. As the surfaces become fretted and the edges of the blocks worn away the evils of absorption are increased, as are also the difficulties of cleaning. Here again, the cleaner the surface the longer it will wear and conduce to the ease and safety of traction.

The phrase "stone sett paving" conjures up before the mind an infinite variety. The modern practice of using carefully dressed stones accurately laid on concrete, with scarcely any thickness of jointing material will produce a surface almost as easily cleansed as wood paving, with the additional advantage of retaining its condition much longer. There are, however, many tens of miles of streets even in the best towns still paved with large, uneven, irregularly laid pieces of granite, with open joints holding and retaining the droppings of the streets, rendering abortive the efforts at cleansing. Fortunately the rotary brush can be passed over these surfaces, dragging out the dirt without injury to the material. One city, out of the twenty mentioned, confesses to still having 145 miles of its streets paved with pebbles, and it is therefore not a matter of surprise that its engineer states that practically all its streets are cleansed by mechanical sweepers; but it is doubtful whether even these can effectually pull out all the dirt or dust from the hollows.

Sixteen of the twenty great towns now under consideration have been able to make definite returns of the mileage of the streets paved with various materials. It has been found that the total length of streets in these sixteen towns is about 3,200 miles. Of these 32 per cent. are paved with stone setts; 3 per cent. with wood paving; 5 per cent. with various materials, including asphalt, and 60 per cent. are still maintained as macadam. Evidently therefore the question of cleansing macadam roads is of very great importance. The quality of the stone of which the surface is composed naturally varies to a great extent with the locality and the material obtainable in the vicinity, but of late years the tendency has rightly been to employ the better classes of granites, basalts and other tough stones, even when the first cost is higher, rather than the softer limestones. The latter are easily crushed under the heavy weights that roads are now called upon to sustain, and by their ready absorption of water are converted into mud to the great increase in the cost of cleansing. A road made of inferior materials causes a large item in municipal expenditure.

Of the twenty towns, horse drawn rotary brushes are used on the streets of fourteen of the number to cleanse the macadam roads; the engineers of the other six being of the opinion that the mechanical sweeper tends to damage the surface. It is thus seen that the majority are in favor of the rotary brush, but it requires to be applied with very great discretion. The author gave up the use of these mechanical appliances, after having been strongly in favor of

them, on account of their effective action, because the coarse bass of which the brush is composed, dragged away the finer particles of the surface, if applied heavily. Still it is evident that the consensus of opinion is in favor of their use. Almost invariably they are drawn by horse-power.

Efforts have been made at various times to produce a machine which will not only brush the road, but at the same time raise the sweepings into a cart attached to it. At least six towns have given trials to these inventions, but the unanimous opinion is that not one has proved itself quite satisfactory.

It is scarcely necessary to record that in all the great towns the principal streets are cleansed at least once in the twenty-four hours, and still more frequently when necessary; this being independent of the continuous cleansing that will be noticed further on. The amount of traffic and the conditions of the weather must decide what has to be done. The second-class streets are usually swept three times a week. With regard to suburban roads and third-class streets, the practice varies from a daily cleansing in some towns to once a week only in others. Whether the street cleansing is carried out better during the day or night is a point on which the towns are not unanimous; there is much to be said on both sides. During the night there is less interference with the traffic by the machines, and the latter having a fair way can act more expeditiously. During the day it is possible to exercise more complete supervision. In eight towns the streets are swept during the night; in seven others by day, and in the five others on the list both day and night. It is evident, therefore, that opinions on the question are nearly equally divided, and local circumstances probably determine which shall be continued.

After the streets have been swept by night or day, with or without mechanical appliances, it is the practice in the majority of the great towns to employ a number of street orderlies, men or boys, to go continuously through the principal thoroughfares and pick up litter and horse droppings, or as one city engineer expresses it, "tidying up all day." In the opinion of the author this process is so important, not only from the point of neatness, but of health, that he was surprised to find one exception. These collections are small in quantity, and are usually placed in hand carts for conveyance to some known point from which they can be removed by a cart. A very ordinary receptacle is a bin either above ground or sunk below the level of the pavement. Where there is a depot within reasonable distance the contents of the hand carts can be taken there direct. This cleaning by street orderlies is much increased in winter and wet weather, when the slop cart has to take the place of the hand cart for street cleansing; for the best method to be then adopted is more dependent on the changes of the weather than the work of any other department of the municipality.

In each of the twenty great towns under consideration the labor for cleansing the streets is employed directly by the corporation. In two of the metropolitan boroughs the carting away and disposing of the sweepings is in the hands of contractors, but in every other case the removal is effected by the administration. Of course, the contractors provide their own tips and get rid of the material to their own advantage.

The provision of suitable places of deposit in the neighborhood of crowded cities is an increasingly difficult one year by year. The practice is generally to tip slop into tanks from which the water is allowed to drain; sometimes the residuum is taken away for use on land. The sweepings from paved streets have a higher manurial value, and at