

ception and practice. They are as follows: Hand sweepers, mechanical brushes and the universal watering cart.

The hand sweeper is perhaps better from the health point of view of the public than the mechanical brush as usually operated, though very unhealthy for the road sweepers. The usual method of operating these is to send them up and down a dry street, certainly collecting some of the heavy dust but dissipating clouds into the atmosphere.

There are several varieties for watering carts, varying from the small hand cart to the large sprinklers and flushers that operate on the car lines. The most familiar form is the horse-drawn cart. While not detracting from the merits of the method, it must be admitted that there is much to be desired in their efficiency. The lighter dust lying on a road surface is disturbed and dissipated into the atmosphere by them, as can be readily seen by the cloud of dust accompanying their passage. This is especially noticeable with the large trolley-driven ones, which, as we see them in action on a dusty road, are the vortex of a cloud of dust. This dust is the direct result of the impact of the numerous jets of water. The sprinklers wash the streets to a considerable extent but they dissipate the lighter dust into the atmosphere and it settles again in due course—it may be on some article of food, it may be drawn into someone's lungs, or perhaps it comes to rest once more on the street.

The injurious organisms in dust which are so inimical to health are of two kinds—animal and vegetable. Both are well represented in street dust. The dust remaining on a watered road makes an excellent breeding bed for these germs and here they increase only to be dissipated once more into the atmosphere with the assistance of the machine brush or the jets of the watering cart. While it is now an accepted fact that dust is so deleterious both to food and health it is not so generally known that the vegetable micro-organisms in atmospheric dust are as a rule very light and float about in lightest dust. Disease microbes are of a heavier nature and are to be found in the lower strata of dust.

The mechanical sweeper and the watering cart do harm in stirring up this dust and dissipating it in the atmosphere. The action of the former in doing this is obvious, while that of the latter is due to the fact that the lighter dust is not caught by such jets as are ejected by the sprinklers. Some of it can be seen floating on the top of the water in the gutters while some of it is dissipated into the atmosphere. Fine dust, like most powdered material, does not assimilate easily with water in bulk.

The writer has had considerable experience in combating dust in many industrial processes, and has found that following the law of nature is the only way to catch the minute particles of dust with water as the agent. In nature, the minute particles of moisture in the atmosphere are attracted to the particles of dust in the air when the atmosphere becomes saturated with moisture. Thus the dust is the nucleus for condensation and every rain-drop is the result. By the same process of reasoning watering carts should emit fine spray as well as jets of water, in order to make the fine dust settle and not be dissipated into the air. There are numerous mechanical difficulties attached to obtaining this fine spray but these can and should be overcome in the interests of the public health. The ideal watering cart should be the vortex of a saturated atmosphere. Enough water should be discharged in its passage over the road to moisten and deposit the finer dust in the surrounding atmosphere as well as that lying

on the surface of the road. It should also, to a great extent, wash it down the drains.

Mechanical brushes should only be operated after the passage of a watering cart. Imperfect watering appliances, uneven surfaces of roads, and want of good judgment in the use of mechanical brushes militate most strongly in perpetuating the dust menace to public health.

Now, as the agitation against dust and microbes is gaining ground, we may hope to see rapid improvements made in the appliances and the treatment of this important detail so necessary to our comfort and our health.

LIME CONCRETE IN THE EAST.*

STONE LIME of great purity, and consequently non-hydraulic, is used largely in India and Burma, and engineers have learned to place considerable confidence in the material. To enable it to set under water, it is mixed with "Soorkhee," a finely powdered red brick. To the present day, engineers in India do not know exactly how much soorkhee is required by each kind of lime, and this ignorance is due to the want of scientific laboratory tests, of the kind so frequently made in Europe. It seems no advantage to send lime and soorkhee to England to be tested, since the difference in climate, the sea voyage, and the lapse of time in transit might vitiate the results. Conservative Indian opinion, based on long experience, approves of a mixture of a half part of underburnt with a half part of well-burnt soorkhee to one part of slaked lime and one part of sharp, clean sand, all measured in bulk, dry. The materials are thoroughly incorporated and ground in a mortar-mill, either under one wheel pulled round a circular track by a bullock, or in a pan-machine under a pair of wheels. The mortar should be a thick reddish paste, in which the particles of lime cannot be distinguished by the naked eye. A mortar made in this way sets very well indeed in still water, but it sets comparatively slowly, and some engineers add, when necessary, a proportion of Portland cement to the mixture. The introduction markedly hastens the setting to an extent depending on the proportion of the cement to lime. One part cement to one part lime by volume sets apparently as quickly as cement mortar. In the early stages of setting the strength of the concrete is much increased, admitting of early handling and removal of moulding boards. The addition of cement preserves soorkhee mortar in wet foundations from the evils of percolation, and the cement, besides, seems to have a chemical effect on the lime, fixing the particles and aiding in a more solid set.

First-class soorkhee mortar, several centuries old, it has been asserted, exceeds Portland cement mortar, 1 to 3, in strength and impermeability, and is said to be often equal to 1 to 2½.

* From a paper by E. A. W. Phillips, M.Inst.C.E., before the Concrete Institute (Great Britain) May 20, 1915.

The \$121,000 dyke, that is being constructed by Tomlinson and Fleming for the Greater Winnipeg Water District at Indian Bay, is about completed.

It is stated that there is a potential value of \$3,600,000,000 in metallic minerals alone in British Columbia that could be recovered in a comparatively short time. The coal resources of the province are estimated by the same statistician at 7,600,000,000 tons of a value of \$216,000,000,000. The mines of British Columbia of all classes have to date paid \$25,000,000 in dividends and in profits not distributed as dividends.