

sold to woolen or shoddy manufacturers. Old boots find a German market, where they are brought to a pulp and molded into trays and fancy ornaments. Old rubbers can be reduced and made over into useful articles. Whole bottles may be cleaned and sold for use. The blood from slaughtered animals can be manufactured into various materials and for several chemical purposes. The fat is rendered into tallow, and the excrements manufactured into a portable inoffensive and valuable manure. The ashes should be sieved through a quarter-inch mesh, and then immersed in water, resieved and the clinkers sorted out, and the residue will then be a fuel almost equal to coal. This goes by the name of washed carbon. The dust dropping through the sieve may be mixed with the contents of privy pits, or the sweepings from paved streets, and sold for manure with the crushed bones. Objectionable material of all kinds that cannot be handled without risk to health, should be consumed in the destructor along with the vegetable and fibrous garbage.

The town council of Cardiff, Wales, has estimated the quantity of each kind of refuse collected in one year, and its selling value in that town:—

Broken crockery, 157 long tons, at 1 shilling	£	7	17	0
Scrap iron, 60 long tons, at	30	"	90	0
Old tins, 227 long tons, at	20	"	227	0
Broken glass, 137 long tons, at	30	"	205	10
Straw and fibrous, 927 long tons, at	20	"	927	0
Waste paper, 1,232 long tons, at	40	"	2,464	0
Rags, 113 long tons, at	60	"	339	0
Coal and coke, 240 long tons, at	5	"	60	0
Small cinders, 18,334 long tons, at 2½ "			2,291	15
Fine dust, 5,611 long tons—No value.				
Animal and vegetable refuse made into a special manure, 1,325 tons, at 20 "			1,325	0
Bones, 138 tons, at	75	"	517	10
Bottles, 12,500 dozen, at 3d. per doz.			156	5
			£8,610	17

In addition to these, there is the heat generated in the destructor furnace, which will raise steam that can be used for power, and is useful in many other ways. The residue from the furnace can be used for building foundations for roads and sidewalks, making cement slabs suitable for paving, etc.; in fact, everything can be made to serve some useful purpose. Bad meats, fish and flesh of all kinds, can be ground and steam-dried by a revolving machine that reduces it to a fine dry powder, making a fertilizer of great value. All this can be done by experienced workpeople in works situated in the centre of a dense population, without the slightest injury to their health; but such works would be a danger and a nuisance, besides a bill of costs to the town, if they were not intelligently managed, with strict rules and cleanliness. From the financial side of refuse disposal, there appears to be nothing to hinder towns from paying a considerable amount of their management expenses from the rubbish the inhabitants throw away, and that gathered in the streets.

Along with an engineer, who for twelve years has been in charge of large boilers and engines where the steam is raised from wet sawdust and the bark from wet saw logs, I visited the West and East End Toronto refuse destructors, which, when properly named, are roasting ovens. They are built on the bakers' oven pattern, but in place of the floors being brick, they are covered by a coarse fire grate having an ash-pit underneath. There is one oven about eight yards long and three yards wide erected on each side of the chimney. At the end (and on the same level of each oven) furthest from the chimney, there are three coal furnaces, and either one or two on each side, making at least five in all for each oven. These

are fired with coal, the fiery gases from all the furnaces enter the oven and make a bee line to the chimney, keeping the crown of the arch at a blood-red heat during their passage across the length of the oven to the outlet flues. And it is safe to assume that the heat from the coal fire enters the chimney at nearly the same temperature that it leaves the fire, which to my mind is a wilful waste of fuel. Destroying the refuse seems to be a secondary consideration here, and the destructors or ovens are not worked to anywhere near their capacity. They only handle the most inflammable portion of the city's refuse. The workmen say they cannot do more, because the chimneys cannot stand the heat. If this is so, the heat ought to be put to some useful purpose and not wasted in the atmosphere. The workmen might do a fair amount of work and place the garbage in the ovens at periods of not over thirty minutes each, in place of twice or thrice each day, keeping the receptacle nearly full and equally spread over the whole of the fire bars. By charging in that way the top layer would be drying and the bottom would be at a fierce heat, and the ovens would easily carbonize and even burn fierce enough to make clinkers without the aid of the present coal furnaces. Why they use coal can only be answered by assuming that they prefer the expense. When I was at the West End destructor not half the grates were properly covered, and they were broken and out of place, so that there were holes that a boy might creep through, and the whole surroundings were dirty, disorderly and unhealthy. At the East End destructor everything was clean and tidy. There was no reason apparently why it should ever be dirty, for there was very little in the ovens, nothing whatever on the filling floors, and nothing about the place but the attendants, with the doors fastened. If the Toronto destructors are a sample and a precedent for our smaller towns to copy, the consumption of coal will be sure to increase.

There are about five kinds of high-class refuse destructors on the market worthy of notice, each having some good points, and when erected by careful workmen, with good brick and fire-clay, are almost everlasting, and seldom need repairs. When erecting brickwork that will have to resist a fierce heat, the fire-clay mortar should be boiled and used hot, about the thickness of cream, and each brick should be made to fit tight to its neighbor throughout the full width so that a knife blade cannot penetrate. I have seen some of these destructors in working order, and will try and explain them before I finish this subject, but will first explain that simpler methods of disposing of garbage to profit can be used. To my mind the fibrous and vegetable garbage similar to what appears to be burnt in Toronto, and what is necessary to be burnt in most of our small towns, together with bad meat, fish, etc., could be burnt and used in exactly the same way that steam is raised to drive saw-mills by burning the heavy, wet sawdust and log bark, and if garbage is not so inflammable as the wet sawdust, a forced draft could be introduced under the fire-bars that would increase the combustion. It is only a matter of making suitable grate and blast arrangements.

Cook's system is used for destroying the bagasse or refuse from the sugar-cane crushing machines which contains over 60 per cent. of water, 6 per cent. of sugar, and the balance fibrous wood, and the heavy wet sawdust and bark from the cutting of sawlogs direct from the pond, which are little more inflammable, if any, than the light refuse collected from the dust bins of a town, or such garbage and refuse as cannot be used for manure, or roadbeds, or filling useless cavities.

Cook's furnaces which raise steam to run the factories without the use and expense of other fuel are constructed