Table 2.—Average Net Cost Per Ton to the City of Chicago for Handling Garbage at the Municipal Garbage Plant from Time of Acquisition to September 30th, 1916

Year.	Expense of operation.	Revenue.	Net cost of operation.	Garbage received.	Net cost per ton.
	$	$	$	Tons.	$
1914....	154,684.48	96,585.06	58,099.42	75,599¾	0.768
1915....	278,570.35	183,196.83	95,373.52	150,874¾	0.632
1916....	432,721.86	410,512.28[1]	22,209.58	137,920½	0.161
Totals	865,976.69	690,294.17	175,682.52	364,395	0.482

[1] During the year 1916 the extractor plant was in operation but from the first of June, and the mill house was not in full operation until the latter part of June.

From January 1st to the time of starting the extractor plant, the city received only $3.27 a ton for commercially dried garbage, which is green garbage dried down to 10 per cent. moisture.

The capacity of the old mill house was not sufficient to handle all garbage degreased, necessitating the storage of approximately 14,000 tons on the property north of the plant, thereby greatly increasing the cost of production of tankage.

Table 3.—Estimated Profit in Handling Garbage at the Chicago Municipal Plant During 1917

Cost of operation.	Revenue[1].	Net revenue.	Garbage, tonnage.	Net profit per ton.
$477,000	$603,000	$126,000	145,000	$0.869

[1] Price of grease taken at 5 cents per pound and tankage at $5.00 per ton, both figures much below the present market prices.

Cost Figures on Garbage Disposal

It is entirely feasible to construct a reduction plant or an incinerator to operate in a sanitary and inoffensive manner. To lay down a fixed set of rules, however, is not permissible, as the waste problems of each city must be considered as separate and distinct. Generally it costs money to incinerate, whereas money can be made by reduction, as will be seen from Tables 1 to 3.

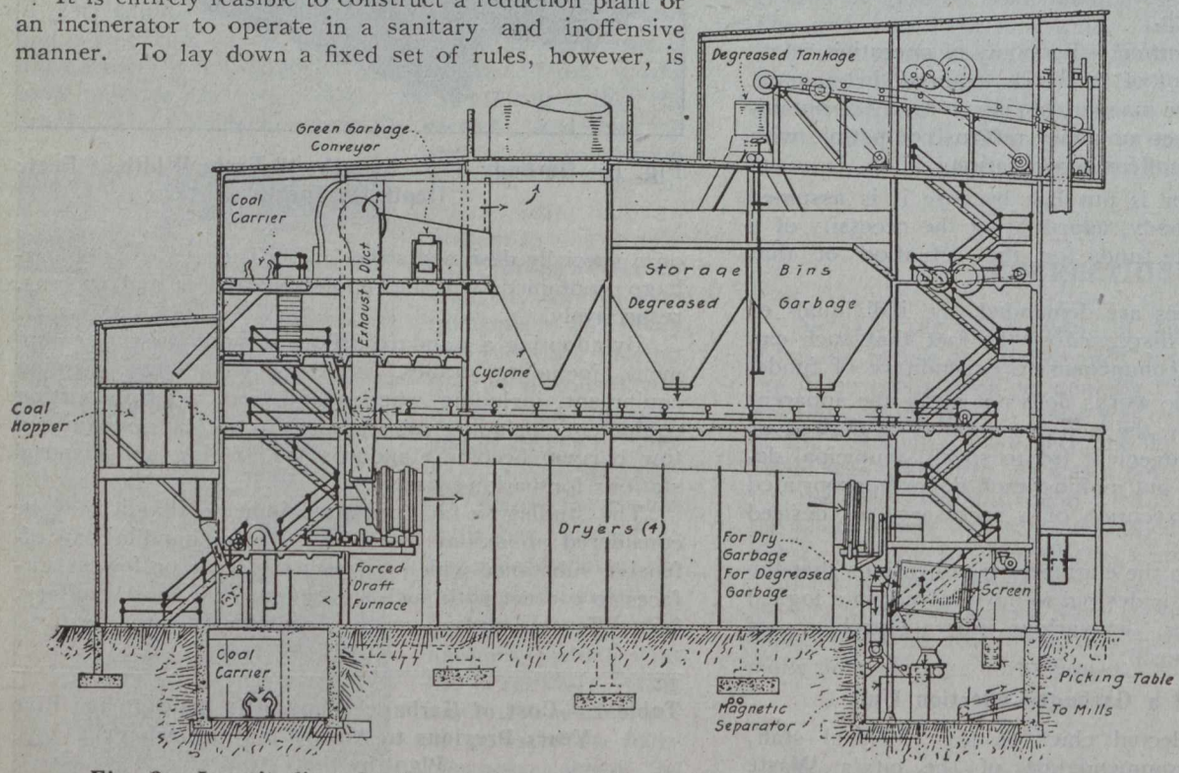

Fig. 2.—Longitudinal Section of Dryer Building, Chicago Municipal Reduction Plant

Systems of Garbage Reduction

Briefly, the following may be considered the present methods or systems of garbage reduction: Cooking process (Arnold and Edgerton), Cobwell system, chemical process, and drying process (Mertz and Simons).

In the cooking process the raw garbage is fed into large tanks called digesters, holding several tons of garbage each. These tanks are then closed and the contents subjected for several hours directly to a steam pressure varying between 40 and 80 lbs. per square inch, the tendency being to break down the cellular structures by boiling.

When the digestion is completed the emulsion of grease and tank liquors is drawn off. The solid matter generally is fed to a press where the main portion of the entrained oil and liquors is forced out, leaving a tankage containing 40 to 50 per cent. of moisture. The tank liquors and grease obtained from the cooking and pressing process are passed through a series of settling tanks or basins in which the grease is separated gravimetrically and drawn off or skimmed from the top.

The tank liquors, which contain considerable fertilizer value, are treated in a multiple-effect evaporator to thicken before mixing with the degreased tankage.

The tankage after pressing is properly dried and subjected in a percolator to the action of a grease solvent which absorbs the remaining grease. The saturated solvent is distilled off and condensed, leaving the grease, the solvent being ready to use again. The degreased tankage and liquor, called "stickwater," are mixed, dried, milled and shipped.

There are several successful reduction plants employing this process, among them being the municipally owned and operated plant of the city of Columbus, Ohio, and privately operated plants at Pittsburgh and Philadelphia.

In the Cobwell system the green garbage is fed into a tub-shaped digester tank of several tons capacity, provided with a steam jacket or interior heating coils, and subjected to the direct action of a grease solvent at a temperature under 200 degrees Fahr. Dehydration takes place for several hours, during which time the vapors are drawn off and condensed. These vapors consist principally of moisture and a portion of entrained solvent. After condensation the solvent is separated from the water and is ready for use again, the water generally being wasted.

During this operation a large proportion of the grease is dissolved in the solvent and the cellular structures for the most part broken down. The saturated solvent is then drawn off.

The tankage remaining in the digester is subjected to one or more washings of grease solvent, for the purpose