It will be noticed that quantities of house refuse are given in cubic yards in this article. This is not general, but would seem to be the better method of measuring owing to the excessive variations in weight. It will be necessary, however, to reduce cubic yards to tons when the amount of power that can be generated has to be ascertained. For this purpose the following weights have been taken:

	Lbs. per cub. yd.
Garbage	1,250
Ashes	1,500
Rubbish	300

Refuse composed of 14 per cent. garbage, 56 per cent. of ashes, and 30 per cent. of rubbish by volume is assumed to weigh 1,100 lbs. per cubic yard.

The calorific value of house refuse, garbage, ashes and rubbish, is of course a variable quantity, but it is usually considered for estimating purposes that 1 lb. of refuse will evaporate one pound of water from and at 212 deg. F. One pound of good steam coal will evaporate 8 to 10 lbs. of water from and at 212 deg. F. The dominating principle, however, in the design of an incinerator plant is the complete destruction of everything, solid and gaseous, and not the production of power, and to do this a temperature of at least 1,250 deg. F. must be constantly maintained, as at this temperature it has been ascertained that gases are rendered innocuous. Higher temperatures, however, should be aimed at, and a temperature of at least 2,000 deg. F. should be maintained in the combustion flue. This, of course, has to be accomplished with the aid of forced draught. For many years the steam jet was used in connection with refuse destructor furnaces, air being forced by the steam through the fire bars, water gas effect being produced and two highly combustible gases evolved, viz., hydrogen and carbon monoxide. These gases assisted in raising the temperature. The air was admitted without being heated, which was a serious drawback when moist or wet refuse had to be dealt with.

It is the general practice now to use hot air blasts in destructor furnaces, the necessary power being provided either by positive blowers or fans. Steam in just sufficient quantity to preserve the fire bars should be used in the forced draught.

We have, therefore, in the design of an incinerator plant to burn the matters collected and dumped at the works, produce a high temperature so as to render all gases innocuous, and provide as much power as is consistent with good results from the aesthetic and health standpoint.

In order to accomplish this the following principles have to be incorporated:

Storage of Refuse at the Incinerator.—In view of providing power for electric lighting, or for heating buildings, it is necessary in order to produce power when it is required to store some part of the day's collection of refuse upon the premises.

Storage should be made in closed receptacles. One form which has been tried in England provides for the storage of refuse in "tubs," which are stored in tiers and conveyed by overhead gear to the furnaces when required, the tubs being sealed with lids to prevent the escape of noxious gases.

The usual method, however, for storage of refuse is in a wrought iron or steel hopper. In order to prevent gases, due to decomposition, escaping, and to prevent the access of flies to the contents of the hoppers, they should be covered with hinged lids, and I would go as far as to recommend that these lids be water-sealed.

Method of Introducing Refuse into the Furnace.—The hoppers for storing refuse are best located above the furnace in such a position that the contents can be raked into a "feeding hole" in the furnaces with the least possible trouble, and as expeditiously as possible, as the length of time the furnace remains open governs the temperature of the whole plant to a large extent. The longer cold air has means of access via the "feeding hole" the cooler will become that particular furnace, and being connected with others the cooling effect will be noticed there also.

Where power is not required and a "direct feed" type of furnace used the refuse is dumped directly from the cart into the furnace.

In either case the feeding hole should be provided with a water-sealed door, in order to prevent the escape of fumes from the furnace while burning is going on. The water seal troughs in connection with the doors are kept at a constant level by a ball cock feed cistern, so that water evaporated by the heat of the furnace is replaced. While feeding or tipping refuse is proceeding it is necessary to introduce a hopper to prevent matters lodging in the trough.

Drying Hearth.—Immediately below the "feeding hole" should be located the drying hearth, upon which the refuse which is to form the next charge should remain whilst the charge is burning on the grate. Refuse contains varying quantities of moisture. Garbage contains from 60 per cent. to 80 per cent. of water. The percentage amount of water in mixed garbage, ashes and rubbish will of course depend largely upon the amount of ashes and rubbish contained. In the green vegetable season when the proportion of ash is low, the amount of moisture would reach the higher figure, while in the winter probably the lower figure would represent the percentage.

It is impossible to entirely remove this moisture on the drying hearth by the general heat of the furnace, and that reflected by the reverberatory arch, in fact only a very small amount of moisture is removed in this way. In drying refuse, gases and offensive fumes are given off, so that it is essential that the furnace be so constructed that these gases and fumes are compelled to pass over the hottest part of the fires before they can gain access to the flues.

Grate.—General practice seems to favor a sloping grate, and I have no hesitation in saying that I consider a sloping grate far in advance of the horizontal type for incinerator furnaces. The slope assists pulling down the refuse from the drying hearth and also facilitates to a very large extent the "clinkering" operation.

The essential features in the design of the fire bars are the retention of as much of the fine particles of refuse as possible and the admission of the proper amount of blast equally distributed throughout the grate area.

The type of grate bar most favored is that in which cylindrical holes are formed at the surface with conical holes at the under side. This type of bar proves very efficient for incinerator furnaces.

The front of the grate is formed by a cast iron dead plate which is placed horizontally and forms a continuous grate to the clinkering door in the front of the furnace. This plate being "dead" the actual flame does not impinge upon the front clinkering door to such an extent as if the perforated bars were continued through to the front.

Ashpit and Blast Chamber.—Below the furnace is provided an ashpit which also forms the blast chamber. The ashpit should be hermetically sealed and a pressure of 1 inch to 1½ inches of water should be maintained while burning. The