gas, useful only to burn under the cast iron retorts along with the bunch wood. So, plainly speaking, Mr Harris cannot make a combined vegetable and water gas with the heat that can be got out of wood burning box stove, because the heat needed to make gas from watery vapors would melt both his stove and his iron retorts, and the gas got from vegetable refuses will not be profitable to manufacture into illuminating gas.

The scientific papers of Great Britain make fun of the reports published in the United States about the garbage gas invention, and laugh the project out of court, saying that the reports read like fairy tales. There is a sarcastic article on page 522 of the *Surveyor*, printed in London, Eng., Nov. 5th, that handles Mr. Harris' reports of his invention without gloves.

It is in order for the inventor to prove that he has found a chemical that will totally change vegetable substances and give them a virtue equal to coal that has taken the earth thousands of years to instill into its nature the gas and heat-giving properties. When that can be done I will gladly welcome the invention.

In Bradford they destroy bad meat and fish by a machine similar to a boiler, that possesses a steam jacket, and revolves, and is evidently filled with knives, for after the wet meat has been in and revolved about an hour, it runs out through a small hole in a fine dry powder, of great value for fertilizing, and the residue of the furnaces is manufactured into mortar, etc. They also find a paying market for every castaway found in and picked out of the rubbish. With the heat evolved they generate electricity and supply power for useful purposes. At Southampton they have lately set in a few extra furnaces of the Goddard, Massey & Warner's type, with forced draught appliances, making them capable of burning 15 tons a day. Multitubular steam boilers are erected on the top of these furnaces that generate steam to a pressure of 160 lbs., which is used to pump and turn the machinery that chemically treats the sewage of the town. The boiler being placed on top of the furnaces will cause the hot gases to have a continuous rising grade from the furnace to the chimney, while in other destructors the gases drop down several feet from the combustion chambers to the underground flue, often as much as 15 tect. This system will be highly satisfactory to engineers, who believe that bending and dropping the flues, and compelling the smoke and heat to go down hill, spoils the draught and wastes the heat. The destructors at Rochdale are somewhat different to the others, being fired by hand through the clinkcring doors at the front, similar to the Lancashire boiler. This has the advantage of its being possible to spread the refuse evenly over the fire and of the proper thickness to insure quick combustion, destroying a larger quantity of refuse than those that are fed from the top, but, on the other hand, the objectionable stuff has to be tipped on the ground floor in front of the furnaces, in place of on top out of sight of most of the attendants, and where the smell can be least perceived. The boroughs of Dewsbury and Warrington have the high temperature destructor furnaces designed by Beaman & Deas, which supply the largest number of units of heat, and a small residuum of wellburnt clinker and ash. They create a great heat from the foulest refuse and garbage that can be handled, supplying a greater amount of heat per lb. of rubbish consumed, besides completely destroying the poisonous fumes usually thrown off when burning excrement, offal, etc.

These furnaces are built in pairs, the fire bars being horizontal, at the rear end there is a sloping, inclined, drying hearth and it has the feeding door at the back end, where the refuse is usually thrown in by hand labor, and when the fires are cleaned and clinkered at the front doors, the refuse which has dried with the heat from the furnace during the time it has been lying on the drying hearth slides down on the top of the fire. There is only one combustion chamber to each pair of fires. Each fire is fed and cleaned alternately, so that when one fire is newly charged with green refuse, and consequently at its coolest period the twin fire is at its highest temperature, and both having to deliver their discharged smoke and gases into one and the same combustion chamber, the high temperature of the one mixing with the low temperature gases of the other, reburns it and raises it up to a high temperature. Thus, the combustion chamber remains at a white heat, which fully destroys any unconsumed fumes of foul gas that may be cast off by the furnaces. A suitable fan is used to create a forced draught which delivers the current of air into the closed ashpit, thus the air is forced pretty evenly between the grate bars into the body of the fire. The crown of



the arch over the fire, called the fire screen, being the partition between the furnace and combustion chamber, is perforated with holes near the front, over the cleaning door, for the escape of the smoke and gases, which compels the fumes from the roasting refuses on the drying hearth to pass over the fire from back to front before entering the combustion chamber. Perhaps the most advantageous and valuable feature of this destructor is the hollow firebrick fire-bridge that forms a passage of atmosphere air from the outside to the rear end of the combustion chamber, where it enters through a quantity of small distributing holes, adding a quantity of warm air to the fiery gases entering the chamber, supplying them with the oxygen needed at that point to reburn and increase the temperature of the gases sufficiently to thoroughly burn and purify the obnoxious fumes. It will be obvious that the cold air passing through the fire bridge must pick up a large quantity of heat by radiation and enter the combustion chamber at a moderate temperature. It is stated that the clinker comes as low as 25 per cent. of the weight of refuses destroyed, while the slow combustion only reaches 33 per cent., a difference of 8 per cent., which means a great deal in the cost of cartage where the residuum of the furnaces has no handy way of being disposed of or manufactured into mortar slabs, paving brick, etc., etc.

This type of destructor has been improved upon in several ways, viz.: In place of using a cold air fan, which chills the fire at the point of attack, cooling the clinkers and causing them to stick to the grate bars, a combined steam and warm air blower is used similar to the steam blower mounted by R. S. Earl, of Toronto, over ten years since, and employed by many steam users in Canada and United States. It consists of a bunch of fine steam jets discharged into about a 9-inch tube, something similar to