

CONFERENCE OF MUNICIPAL AND COUNTY ENGINEERS.

THE proceedings of the Conference commenced with an address by the President, Mr. A. M. FOWLER, M.Inst.C.E., published in Vol. XV., Part III.

On "The Disposal of Town and other Refuse by Burning," by
JAMES DEAS.

ABSTRACT.

THE question of dealing with towns refuse has occupied the attention of local and municipal authorities in this country for many years past. Various schemes have been suggested to remedy the evil, but all are now agreed that the most economical and safest from a public health point of view is to destroy it by fire.

The great objection to the forms of destructor now in use is the possibility of offensive vapours and charred paper going up the chimney shaft and causing a nuisance to the surrounding neighbourhood. The charging arrangements are so constructed that the outlets of combustion are at the back of the furnace, and that whilst a charge is burning upon the furnace bars, the next charge is upon the dead hearth near the outlet flue where it undergoes drying and partial decomposition, with the result that offensive vapours are given off without being exposed to sufficient heat to render them inoffensive. (See Report of the London County Council.)

The following are the necessary conditions for a perfect destructor:—

1. To destroy rapidly all unscreened refuse from a town of whatever description without committing any offence or possible nuisance.

2. To reduce the refuse dealt with, to the least possible amount of clinker.

3. To deal with the refuse and bye-products with the greatest economy and efficiency.

In the new destructor at Warrington the above conditions are complied with and successfully carried out. It has now been in operation and worked continuously day and night for thirteen months.

The total height from ground level to charging platform is only 8 ft. 9 in., half the height of the inclined roadway to other destructors. The refuse is tipped direct into a hopper and falls down on to the inclined path, where it is partially burnt and dried, and all the gases are absolutely destroyed by the radiation of the intense heat of the furnace as they are drawn through and over the hottest part of the fire, entering into ignition and complete combustion in the chamber (where a temperature of over 2000 F. is maintained) before finally passing away to the boiler. This intense heat and form of furnace does away with the necessity of a second fire, dignified by the name of cremator.

Mr. Carter Bell, County Analyst, has tested the escaping gases several times, and the following is his analysis:—

The results are given in percentages by volume:

Carbonic Acid	...	...	...	...	7.2
Oxygen	...	...	...	...	11.8
Nitrogen, Sulphurous Acid, Water Vapour					81.0
					100.0

He adds in his report:—"I drew various samples of gases from the chamber at the foot of the chimney shaft, and in no case did I find the slightest trace of sulphuretted hydrogen or mephitic vapours. There is NO TRACE of *carbonic oxide*."

The average quantity burnt per cell by other forms of destructor is given at $6\frac{1}{2}$ tons per 24 hours.

The following figures are given by an independent 24 hours test on this destructor by the Leeds Corporation.

(COPY CERTIFIED.)

Tests of "*Beaman & Deas*" Destructor Furnace. Warrington Installation.

Date (noon to noon), November 23rd and 24th, 1893.

Duration of trial, 24 hours.

Nature of Fuel, Unscreened Refuse.

Total quantity of fuel burnt	53536 lbs.	=	23 tons 18 cwt.
Quantity of fuel per hour	2231 lbs.	=	19 cwts. 3 qrs.
Tl. qnty. of water evaporated	61344 lbs.	=	6134 galls.
Qnty. of water pr. hr. (1271 h.p.)	2556 lbs.	=	255 galls.
Weight of clinker produced	14980 lbs.	=	6 tons 13 cwt.

Per cent. of clinker	27.9
Pressure of steam maintained	68 lbs.
Temperature of air in boiler house	45°
Temperature of feed water	104° F.
Temperature of gases leaving damper	650° F.
Quantity of water evaporated per lb. of house refuse	1.14
Average temperature by copper wire test	2,000° F.
Average air pressure (water) maintained	2½ ins.
Draught velocity in feet per minute	820

(Signed)

GEORGE DARLEY,
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The whole refuse is weighed at the works and the daily amount burnt in this furnace equals 20 tons per 24 hours, which far exceeds all other forms at present in use. Objection has been raised by parties viewing this destructor at Warrington to the high temperature attained, and the possibility of the brick-work being rapidly burned away. The experience of thirteen months continuous working does not confirm this opinion, as no repairs have been necessary and no expense has been incurred.

During the process of burning, fine particles of dust fix themselves on the crown of the arch and exposed portions of the furnace in a stalactitic form, thus protecting the brickwork from the intense heat.

The following analysis was made by Mr. J. Carter Bell:—

Silica	...	...	...	...	55.364
Oxides of Iron	...	...	...	...	15.711
Alumina	...	...	...	...	17.362
Lime	...	...	...	...	5.390
Magnesia, Potash, Soda,	}				6.173
Sulphuric Acid					

This furnace has been at work since August, 1893, and is as good now as on the day it was erected.

I have made repeated experiments in burning sludge mixed with town refuse with success. The following test was made a few weeks ago:—One ton of sludge mixed with one ton of unscreened town refuse, when the whole was completely burned in 1 hour 35 minutes and gave 25 % clinker.

From daily experience I find that I can evaporate 1 lb. of water from 1 lb. of unscreened town refuse, and the value of steam, in my opinion, by burning towns refuse will form a very important factor for corporations in the near future.