On "*The Acme Refuse Destructor*," by H. ROYLE, Assoc.M.
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IT is a matter of universal admission that the heaping together of putrescent or decomposing matter such as towns' refuse, is an evil, and that as yet no better process by which it can be converted into fixed and harmless products has presented itself or been proposed than combustion. As by this means all the organic products present (these being the objectionable portions) are converted into the comparatively, if not absolutely, harmless forms of water vapour, that is pure steam, carbonic acid gas, and nitrogen, all of which are contained in atmospheric air as it is commonly found.

This desirable effect is brought about by means of a furnace-like apparatus known as a "Destructor," a somewhat inappropriate name inasmuch as matter cannot be destroyed but only changed. Of these destructors there are many forms offered, each more or less efficiently doing its work. It would be a tedious waste of time to individually criticise the construction and merits, or demerits of each one. The general construction of all is very similar. The refuse to be burned is dropped on to a sloping bed at the back of the furnace where it loses the water and other volatile matter contained in it. From thence it is moved on to the bars or furnace proper, and there the remaining organic matter is burnt out; finally the ashes or clinkers, that is the non-combustible portion, is raked out. It appears that the real character of this drying bed has been much overlooked, and that it is not generally known what an insanitary sinner it is.

The mode of working generally adopted is as follows:—When the charge on the lower bars is sufficiently burned, the attendant rakes out the greater portion, leaving on the bars a sufficiency of burning material to ignite the next charge which he rakes or pushes down from the drying bed, which drying bed again in its turn is covered with a fresh charge of raw material; when the dried charge comes into contact with the red hot portion left on the bars, a process known to chemists as dry distillation commences, and this continues until the ignition is complete or until the bulk is converted into charcoal. It is well known to chemists that the products resulting from the dry distillation of organic matter containing much nitrogen and sulphur (such as fœcal and other like matters always do) are invariably of a most nauseous and offensive character, noxious to the sense of smell and likely to be pernicious from a sanitary point of view. These vapours in their turn pass over the drying bed, causing the elimination of vapours of the same character

and similar properties as themselves, and this goes on charge after charge, and were it not for a high chimney, which like charity covers a multitude of sins, the presence of such a so-called destructor would be unendurable in any neighbourhood. That this state of things exists, a sudden visit, incognito, to one of these destructors will prove to any persons desirous of knowing the truth of the matter. Even inspection of the chimney top and its tinted vapours will to some extent show the various stages of the process. It seems that a destructor is deemed to be doing perfect work if it does *not* produce a local smell and *does* produce a quantity of hard slaggy cinder, which can be shown with great pride to visitors as an undoubted proof of its great efficiency.

That this state of things has not passed unobserved is shown from attempts made to obviate the evil. To this end rocking bars have been employed; these by their motion bring the raw or dried charge on to the glowing mass in smaller quantities at once, and so somewhat reduce the evil. In some cases, again, the most clumsy of all devices, a fume cremator is employed which is essentially a mass of glowing coke. This, though effectual for destroying the offensive organic vapours arising from the concentration of manurial material and which are necessarily of low temperature, simply betrays by its presence that the destructor to which it is attached has been constructed on erroneous principles.

The inventors of the Acme Destructor, in their design, kept in view the necessity of complete combustion of all the organic matter, and not the merely putting it out of sight and smell. The refuse is tipped into the large receptacle or hopper, from whence it falls through the opening on to the sloping bars, which are set at about an angle of 45° ; and as the organic or combustible portion burns out, the residual material gradually falls to the lowest position, whence it is removed by the attendant at the front and side (using a long shanked shovel).

As quickly as it is removed a further quantity falls down the inclined plane formed by the bars, which in its turn is followed by a fresh portion from the hopper. Thus the feeding in of the material is almost as gradual as though rocking bars were employed. The action of the hanging bridge is important; any vapour evolved from the raw material is deflected partly over the surface of, and partly actually through, the already incandescent portion, where it also meets the red hot gases arising from the combustion of the lower portion and becoming ignited, finally passes through the combustion chambers, heating these to such a high temperature that no combustible vapour can escape. As each spadeful is withdrawn it is followed through

the whole system by an equal volume of the raw material, the volatile matter from which being thus slowly evolved has ample time for complete combustion, which cannot be the case where large charges are thrown on at one time. Although designed as a destructor only, it is as capable as any other of being adapted to the generating of steam when the material to be burned contains enough heat-producing material; it equally permits the use of rocking bars, as also the use of a steam or other blower being applied. For the latter purpose it is only necessary to close the front as is usually done and fix the necessary blower or fan.

The inventors of the "Acme" Destructor claim for it:—

1. That it can be constructed at less first cost than any other.
2. That for efficiency, for ease of working, that is the feeding with raw and the removal of burnt material, it offers every advantage.
3. That from its simplicity and freedom from working parts, it is less liable to get out of order than any other, therefore will neither require expensive skilled labour, nor incur frequent stoppages with consequent decrease of working time. Any repairs needed can be done by any ordinary blacksmith or bricklayer.
4. That it effects complete combustion of all carbonaceous or other organic matter in a systematic manner, all vapours having to pass through red hot material and highly-heated combustion chambers, thus rendering the escape of noxious gases impossible.

NOTE.—A paper *On "A Description of some Recent Improvements in Destructors,"* by JOHN A. BRODIE, Assoc.M. Inst.C.E., was also read.

Visits were made to the Liverpool Destructor Works, Hydraulic Power Company's Station, Toxteth Park Destructor Works, and Liverpool Electric Supply Company's Central Station.