

On charcoal as a disinfectant : being a letter to the editor of the "Times," as published in that journal on the 22nd November, 1854 / by Dr. John Stenhouse.

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ON
CHARCOAL
AS
A DISINFECTANT.

BEING

A LETTER TO THE EDITOR OF THE "TIMES;" AS PUBLISHED IN THAT JOURNAL
ON THE 22ND NOVEMBER, 1854.

BY

DR. JOHN STENHOUSE, F.R.S.,

Lecturer on Chemistry at St. Bartholomew's Hospital, London.

C



THE great efficacy of wood and animal charcoal in absorbing effluvia and the greater number of gases and vapours has long been known.

Charcoal powder has also, during many centuries, been advantageously employed as a filter for putrid water, the object in view being to deprive the water of numerous organic impurities diffused through it, which exert injurious effects on the animal economy.

It is certainly somewhat remarkable that the very obvious application of a perfectly similar operation to the still rarer fluid in which we live—namely, the air, which not unfrequently contains even more

noxious organic impurities floating in it than those present in water, should have, up till February last, been so unaccountably overlooked.

Charcoal not only absorbs effluvia and gaseous bodies; but, especially when in contact with atmospheric air, rapidly oxidizes and destroys many of the easily alterable ones, by resolving them into the simplest combinations they are capable of forming, which are chiefly water and carbonic acid.

It is on this oxidizing property of charcoal as well as on its absorbent power that its efficacy as a deodorizing and disinfecting agent chiefly depends.

Effluvia and miasmata are usually regarded as highly organized, nitrogenous, easily alterable bodies. When these are absorbed by charcoal, they come in contact with highly condensed oxygen gas, which exists within the pores of all charcoal which has been exposed to the air, even for a few minutes; in this way they are oxidized and destroyed. My attention has been specially directed for nearly a twelvemonth to the deodorizing and disinfecting properties of charcoal, and I have made an immense number of experiments on this subject.

On the 22nd of February last I brought the subject before the Society of Arts, and on that occasion exhibited a specimen of a charcoal respirator and the mode of employing it. I likewise dwelt at some length on the utility of charcoal powder as a means of preventing the escape of noxious effluvia from churchyards, and from dead bodies on board ship and in other situations.

On the 9th of June last I also, in a letter to the Society of Arts, proposed to employ charcoal ventilators, consisting of a thin layer of charcoal enclosed between two sheets of wire gauze, to purify the foul air which is apt to accumulate in waterclosets, in the close wards of hospitals, and in the impure atmospheres of many of the back courts and mews-lanes of large cities, all the impurities being absorbed and retained by the charcoal, while a current of pure air alone is admitted into the neighbouring apartments.

In this way pure air is obtained from exceedingly impure sources. Such an arrangement as this, carried out on a pretty large scale, would be especially useful to persons necessitated to live in pestiferous districts within the tropics, where the miasmata of ague, yellow fever, and similar diseases are prevalent.

The proper amount of air required by houses in such situations might be admitted through sheets of wire gauze or coarse canvas, containing a thin layer of coarse charcoal powder.

Under such circumstances also pillows stuffed with powdered charcoal, and bed coverlets having the same material quilted into them, could not fail to prove highly beneficial.

A tolerably thick charcoal ventilator, such as I have just described, could be very advantageously applied to the gully-holes of our common sewers, and to the sinks in private dwellings, the foul water in both cases being carried into the drain by means

of tolerably wide syphon pipes, retaining always about a couple of inches of water.

Such an arrangement would effectually prevent the escape of any effluvia, would be easy of construction, and not likely to get soon out of order.

The charcoal respirators to which I have already referred, and to which I should wish to draw especial attention, are of three kinds.

The first form of the respirator is constructed for the mouth alone, and does not differ in appearance from an ordinary respirator, but is only half its weight, and about one-fifth of its price.

The air is made to pass through a quarter of an inch of coarsely powdered charcoal, retained in its place by two sheets of silvered wire gauze covered over with thin woollen cloth, by which means its temperature is greatly increased. This charcoal respirator possesses several advantages over the respirators ordinarily in use:—

1stly. Where the breath is at all fetid, which is usually the case in diseases of the chest, under many forms of dyspepsia, &c., the disagreeable effluvia are absorbed by the charcoal, so that comparatively pure air alone is inspired. This, I think, may occasionally exert a beneficial influence on diseases of the throat and lungs.

2ndly. The charcoal respirator for the mouth alone will certainly prove highly useful in poisonous atmospheres, where miasmata abound, if the simple precaution is only observed of inspiring the air by the mouth and expiring it by the nostrils.

The second form of respirator is ori-nasal—that is, embracing both the mouth and the nose. It is only very slightly larger than the one already described, and does not cover the nose as the ordinary ori-nasal respirator does, but merely touches its lower extremity, to which it is adapted by means of a piece of flexible metal covered with soft leather. When this respirator is worn no air enters the lungs without first passing through the charcoal, and any effluvia or miasmata contained in the atmosphere are absorbed and oxidized by the charcoal. This form of the respirator, therefore, is peculiarly adapted for protecting the wearer against fevers and other infectious diseases.

The third form of the respirator is also ori-nasal, but is much larger, and therefore more cumbrous than the preceding variety. It is intended chiefly for use in chemical works, common sewers, &c., to protect the workmen from the noxious effects of the deleterious gases to which they are frequently exposed.

I think it but justice to myself to state that I have no pecuniary interest in any of those respirators. Though strongly urged to do so, I refrained from securing them by patent, on the ground that inventions for the prevention of death and disease ought to be sold at the lowest possible price, and should not, therefore, be encumbered with the expense and restrictions attendant upon patent rights. These respirators have been very successfully manufactured by Mr. W. B. Rooff, of 8, Willow Walk, Kentish Town,

who sells the one for the mouth alone at 6s. ; the small ori-nasal at 8s. ; and the large ori-nasal at 10s. each.

I am aware that some persons, who admit the deodorizing properties of charcoal, deny that it acts as a disinfectant. I would direct the attention of such persons to the following statement of facts:—About a year ago the bodies of a full grown cat and two rats were placed in open pans, and, covered by two inches of powdered charcoal. The pans have stood during all that time in my laboratory, and though it is generally very warm, not the slightest smell has ever been perceptible, nor have any injurious effects been experienced by any of the nine or ten persons by whom the laboratory is daily frequented.

Now, had the bodies of these animals been left to putrefy under ordinary circumstances, not only would the stench emitted have been intolerable, but some of the persons would certainly have been struck down by fever or other malignant disorders. Within the last few months charcoal powder has been most successfully employed both at St. Mary's and St. Bartholomew's Hospitals, to arrest the progress of gangrene and other putrid sores. The charcoal does not require to be put immediately in contact with the sores, but is placed above the dressings, not unfrequently quilted loosely into a little cotton wool. In many cases patients who were rapidly sinking have been restored to health.

In the instance of hospital gangrene, we have to

deal not only with effluvia, but also with real miasmata; for, as is well known, the poisonous gases emitted by gangrenous sores not only affect the individual with whom the mischief has originated, but readily infect the perfectly healthy wounds of any individuals who may happen to be in its vicinity. So that in this way gangrene has been known to spread not only through one ward, but through several wards of the same hospital.

Within the last few weeks the dissecting room at St. Bartholomew's Hospital has been perfectly deodorised by means of a few trays filled with a thin layer of freshly heated wood charcoal. A similar arrangement will, in all probability, be likewise soon applied to the wards of St. Bartholomew's, and every other well-conducted hospital.

From these and other considerations, therefore, I feel perfectly confident that charcoal will prove by far the cheapest and best disinfectant.

Unlike many other disinfectants it evolves no disagreeable vapours, and if heated in close vessels will always act, however long it has been in use, quite as effectively as at first.

If our soldiers and sailors, therefore, when placed in unhealthy situations were furnished with charcoal respirators, such as the second form above described, and if the floors of the tents and the lower decks of ships were covered by a thin layer of freshly burnt wood charcoal, I think we could have little in future to apprehend from the ravages of cholera, yellow fever, and similar diseases by which our forces have

of late been decimated. If found more convenient, the charcoal powder might be covered with coarse canvas, without its disinfectant properties being materially impaired.

The efficiency of the charcoal may be greatly increased by making it red-hot before using it. This can easily be done by heating it in an iron saucepan covered by an iron lid.

When the charcoal is to be applied to inflammable substances, such as wooden floors, &c., of course it must be allowed to cool in close vessels before being used.

I am, Sir,

Your obedient Servant,

JOHN STENHOUSE, LL.D, F.R.S.,

Lecturer on Chemistry at St. Bartholomew's Hospital.

ST. BARTHOLOMEW'S HOSPITAL,

November 17, 1854.

* * Two or three additional sentences have been added; but all the rest of the Letter remains exactly as it appeared in the "Times" of the 22nd November last.



