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NATIONAL HEALTH SOCIETY.

SANITARY IMPROVEMENT.

Extract from a Paper Read before the above Society, January 9th, 1873,

BY

MR. CONYERS MORRELL,

ON

"THE PROGRESS OF SANITARY SCIENCE, WITH ESPECIAL REFERENCE TO HOUSE REFUSE."

(Reprinted from the Essex and West Suffolk Gazette.)

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NATIONAL HEALTH SOCIETY.

(Reprinted from the *Essex and West Suffolk Gazette.*)

Mr. Conyers Morrell, of St. Ann's-square, Manchester, read a paper before this Society at the Library, 1, Adam-street, Adelphi, London, on "The Progress of Sanitary Science with especial reference to House Refuse." After referring to the pollution of the air we breathe, and the water we drink, from the improper mode of collecting and disposing of this refuse, Mr. Morrell concluded by offering some practical remarks on the remedy he proposes as follows:—

Water Carriage System.

With these dry systems before us we cannot wonder that, for the removal of certain portions of house refuse, the water closet advocates gain an easy victory for their system—and how accordingly the water system is asserted by some to be the only satisfactory means of getting rid of such refuse. Let us, however, assume the system to be free from the objections already urged against it, and that it is so perfect in its operation that the moment you lift a handle the basin is cleared of its contents, and these carried direct, without staying in their course, to the sewer's outlet, and then vanish, without offence or injury to anyone or anything; we still find ourselves only partially relieved of the source from which danger arises—for our ashpits are still charged with the contents they previously held, minus only the human excrement; contents including cinders, ashes, domestic vegetable refuse, house slops, &c.—an accumulation which, when gathered miscellaneously together, I contend is capable of producing almost, if not quite, as serious results as when the excrementitious products form a portion of the mass. The water closet advocates could therefore only lay claim to have very partially removed the sources of evil.

Nature of House Refuse.

Now a little reflection will serve to convince us that nature has thrown into our laps all things that we require. Our almost wilful ignorance prevents our using these things aright. If we carefully examine the details forming the waste products of the dwelling-house, we shall find that we have on the premises not only matter that is offensive, but also matter which can subdue that offence. I need scarcely repeat that whilst we have "Excrementitious refuse," we have also "Fire refuse," commonly called ashes—but containing in reality a large proportion of unconsumed fuel in the form of *cinders*, the remainder being a powerful deoderant in the form of fine *ash-dust*. To this material I refer when I say that we have on the premises the very means of subduing the offensive character of other matter.

Ash-dust as a Deodorizer.

I wish especially to make make myself clearly understood by asking you to recognise the distinction between house refuse in the form of ashes containing *cinders* and *ash-dust*, when separated from cinders. When combined and mixed with other refuse in the ash-midden, open or closed, we find the effect is bad; but when the ash-dust is separated, and cast equally upon the excrementitious refuse, we find its effect as a deodorizer is perfect. Now I do not suppose that the deodorizing power of ash-dust will be disputed. Examples in domestic life exist of its efficacy, and it has been used for, I may say centuries, in a rude fashion for this purpose. Recognizing, therefore, the fact that every human habitation possesses this refuse in quantities more or less; and granting that, if a given quantity of ash-dust is scattered over the soil after each use of the closet, it acts as a perfect deodorizer, we may then ask ourselves—how can we thus practically make use of such ash-dust with the object of rendering inoffensive that other portion of domestic refuse which is known as excrementitious, and thus attain an important sanitary advantage by its aid? We may also further ask—how can we economize by securing the cinders for re-consumption as fuel, and, further, how we can efficiently provide for the collection and disposal of house refuse in the form of garbage, &c.?

Quantity of Ash-dust.

As regards the quantity of ash-dust, a question equal in importance to its deodorizing power, I may say that one gentleman wrote to me some time since, that "three cottages have in 16 days made 138lbs. cinders, and 244lbs. fine ash." Another wrote to me, "the results of my experiments in the quantity of excre-

ment and coal dust made is, 38lbs coal dust per house per week, and a little over 1¼lbs of excrement per diem per person." These statements confirm my own experiments, which give nearly 1lb of ash-dust per head per day for deodorizing purposes. And this is proportionately confirmed again by another extending over four days which gave 7 tons of ash dust for 11 tons of excrement. Another gentleman, after somewhat extensive experience, writes "the usual quantity of ashes produced by a private house is sufficient for all deodorizing purposes." Another says, after some experience in the use of ash dust in connection with ordinary cottages, "I have been present on several occasions during the process of emptying the receptacles and can answer for the inodorous and perfectly inoffensive character of the deposit."

Having by these evidences, I hope, satisfied you that ash dust will not only deodorize, but that a sufficient quantity exists on the premises to meet all requirements, I will now endeavour to explain to you the means whereby the same may be applied alike at the mansion, the cottage, and the public institution.

Description of Morrell's Combined Cinder-sifter and Ash-closet.

The evil of throwing cinders and ashes together into the ash midden has been felt by some from a sanitary point of view—by others from an economical one, and they have adopted a very rude remedy in the form of a screen made with bars fixed at and over the ash midden. From this the cinders have to be drawn with a rake, an operation which besides involving a certain amount of manual labour, is defective from the fact that the distance of the bars from each other does not procure a perfect separation of the dust from the cinders. The system which I advocate provides for the perfect separation of the *ash-dust* from the *cinders* by means of a screen or sieve of galvanized woven wire placed at the rear or side of the ordinary closet into which house ashes may fall by being simply thrown, as now, through a hole in the wall. Attached to this screen are parts which form a hopper for receiving the ashes. This screen and hopper, forming one, are connected by a simple lever arrangement to the seat of the closet, or by a foot treadle in front of the seat in such a manner that, when the closet is used, an agitating motion is given to the screener by which the cinders are made to fall down the incline, the ash dust dropping through into the hopper below, and thence into a small receiver from which it is meted out in the exact quantity required over

the recent dejecture, when the seat is vacated. Thus the ash dust is by this simple, self-acting contrivance separated from the cinders, and on each use of the closet is made to serve as a sanitary agent by arresting the decomposition of the fœcal refuse, the cinders being thrown simultaneously on to the coal heap, or on to the floor, or into a box for re-consumption at the house fire.

Material which may be added

House sweepings, dried earth, or any other dry material may be thrown in with the ashes, as the screener rejects all the portions unsuited for use in the closet.

Receptacle for Soil.

The receptacle for the soil may be a moveable vessel or a fixed water-tight trough. In general practice my impression is that a fixed trough made of a small capacity, corresponding — say with the size of the seat in length and breadth, and of about one foot to two feet deep, and emptied at one end, will prove the most serviceable and efficient. The application of this arrangement to existing structures is best accomplished by filling up the cess or ash midden to the level of the surface with (in case the small vault is used) the exception of the space it will occupy below the seat.

Space occupied.

The total space, then, occupied will be an addition to the privy proper, but only by as much as is taken up by the screener which will usually be found to be much less than that occupied by the old ash-midden. For new erections the total space absolutely necessary need not exceed 6ft. by 2ft. 6in., but these dimensions can be extended if larger premises are preferred.

Application for Access from Internal of House.

If it is desired to apply the system so that the closet can be entered from the inside of the house, the screening portion of the apparatus can be placed as a projection from the external wall, and be accessible for charging with ashes from the outside. In this case the privacy of the closet proper is preserved, and all the advantage of the internal earth closet secured, whilst the cinders are thrown for collection outside and the vault emptied, or the soil-pan removed from the outside.

Importance of Arresting at once Tendency to Decomposition.

Whether the vault or the moveable soil-pan is used, I consider it essential that a due quantity of the deodorizing agent should fall upon each layer of soil. The importance of this will be felt when I remind you that excrementitious refuse collected in an ordinary tub begins to decompose in twenty-four hours—and rapidly becomes the nuisance it is for this reason reported to be in Rochdale and as I have myself found it in other places.

Cinders Saved.

Thus in the way I have described, without involving any additional labour on the part of the occupant of the house, does what is called the ash screening closet system render inoffensive the hitherto poison-producing filth of the house; and in so doing not only does it effect a very considerable saving in the consumption of the fuel (as one gentlemen writes)—"to the extent of 20 per cent. on his consumption," but it produces also a valuable manure manufactured ready for use by the farmer.

Removal

If the soil pan system is adopted I recommend removal once or twice a week—if the vault, the emptying may take place monthly—as is the case with the seventy closets fixed by the gentleman already mentioned, who writes that he has witnessed the emptying, and can testify to the inoffensive character of the refuse. In either case the manure thus made may be taken to a suitable depository, to which also the street sweepings of a town could be taken—whence it would either be sent off into the agricultural districts, or called for by farmers as they return empty from the market.

Economic Effect and Value of Manures

Thus the farmer, and through him the nation, is benefitted by the conversion of the now wasted house refuse into a valuable, concentrated, portable manure, freed from all injurious rubbish, available alike for the hill-top and the valley. That the manure thus made does possess a value, I think I need scarcely take up your time by arguing. I will, therefore, give you, as briefly as possible, the opinion of others. Professor Watts, in his Dictionary of Chemistry, gives an analysis of various coal ashes, showing that they contain silicia, alumina, sesqui-oxide of iron, lime, magnesia, potash, &c., or an agricultural value of from 17s. 10d. to 11s. 4d. per ton,—a value which must be much increased when combined with the night-soil of towns. An interesting experiment was recorded in the "Quarterly Review" some time since on the value of coal-ashes. Wheat, oats, and strawberry plants, growing on a bed of coal-ashes, were stated to have attained a condition of luxuriance exceeding similar plants grown on ordinary soil. One gentleman writes, after using the apparatus and testing the manure:—"The contents, from the nature of the apparatus, are very evenly mixed with the ash-dust, thereby immediately preventing any disagreeable smell, and in my opinion the whole of the chemical properties are secreted by the ash-dust, instead of escaping into the air, as in the old system. Consequently, the waste ashes, &c., from the house are uti-

lized, and help to form a much more valuable, and also a much more manageable manure, than from any closet I have previously seen. The effect of this mauure on grass land is marvellous. A very slight dressing tried on a small space showed in a few weeks a much richer colour than the surrounding undressed grass—and in other ways it has proved itself a manure of great strength." Another gentleman writes :—"I have as yet disposed of the deposit for a very small sum, far under its value, viz., £1 per ton, but as its value as a rich and remarkably fertilizing manure becomes known, it should fetch £3 to £4 per ton, and as each closet contains or accumulates about 25 cwt. per annum, it will be seen that, apart from its sanitary advantages, the adoption of the closet is a good and remunerative investment." A report which recently appeared in the papers on the growth of cotton, related how the destruction of worms and caterpillars, which had become the pests of the cotton fields, was effected by strewing a mixture of ashes and lime over the soil in which the grub makes its appearance. May not the grub and fly in our turnip fields be destroyed by a similar application? * In my own experience the extraordinary fertilizing power of the manure was wonderfully illustrated in the growth of celery. A ridge upon which the manure was used produced a plant double the height of that on the neighbouring ridge, and doubly rich in colour.

Garbage.

The garbage refuse may be collected in a separate vessel on the premises and used as pig food, or it may be disposed of by burning as recommended some time since by Dr. Whitmore.

House Slops.

The ordinary house slops may, I believe, under this system, be entrusted with confidence to the street sewers. From their liquid character and from their excessively diluted condition, I believe, also, that they may, as they were before the days of water closets, be safely entrusted to the river, but if not, special provision is made in connection with the dry-ash system I have explained, for the filtering of such liquid through a small quantity of the cinders saved by the process, before it need be passed into the sewer, and so reach the river in at least an unpolluting

* Since this paper was read, the author has learned that the farmers of several counties purchase ashes at a cost of from 1½d. per bushel, and sift from them the dust, for use as a dressing for clover and turnips.

state. The system I advocate embraces another mode af cleansing this refuse on the premises, but not feeling acutely the necessity for this, I withhold for the present any remarks upon it.

Manual Labour Reduced.

It may at a first glance strike some of you that the manual labour required to work such a system as that I have described will be enormous. This impression will however, be removed when I explain to you that the present staff of scavengers may be reduced instead of increased under such a system, because the bulk of the cinders now removed is left on the premises for reconsumption, and the process involves much less labour on the premises, from the fact that that barbarous method of sending a man into a pit to throw out the refuse will be done away with.

Broken Pots.

The broken pots and vegetable refuse require removing under any system—and it is surely more advantageous to carry this refuse away separately, than in combination with excrementitious filth.

Application of System to Large Towns.

We shall be told that the system is more applicable to small villages than large towns; the reverse is the case, for whilst the village possesses many opportunities of getting rid of its refuse, the town is surrounded by land, occupied by gentlemen's residences and daily falling into demand for the extension of the town itself. Neither does the small village suffer as a large community occupying a vast area does by the passing of its refuse from neighbour to neighbour in its long and tedious course to its final repository, when conveyed by the aid of water.

Appreciation of Improved Sanitary Arrangements.

Some will say it is all very well to talk of these improved sanitary arrangements for the poorer classes, but, in actual practice, they will not work because these people will not appropriate or attend to them. This has been an oft-repeated argument to me. I have, however, asked to be shown this filthy people and the filthy places they are said to keep, and I have as invariably found that the filth and dirt has not been the result of the use of those occupying the house attached to the closet, where a number of houses have one closet in common, but that the filth originates from the casual passer-by, may be a drunken man at night, and such like. In all cases the people have told me that they would gladly keep their closets clean if they could only have proper control over them.

Means of Providing for Cost of Improvements.

As to the cost of alteration to the premises—I conclude it is quite as easy to find a means of meeting this without undue pressure upon the property owner as it is to find the means to provide an additional water supply—or costly works for the disposal of the refuse of town sewers—without, on the other hand, oppressing the ratepayers. At any rate so important is the sanitary condition of the country that all agree the means must be provided from one source or another, whether by the property owner, or by the authorities of the various towns and localities they govern, it is not for me to say. It is sufficient for me to remind you that to accomplish certain ends certain means must be used, and they cannot be provided without the necessary sinews of war. That system which produces the best effect with the most remunerative result will be acknowledged by all as the one most worthy of general adoption.

Cost and Financial Statement.

Now, though figures are elastic things, the following are conscientiously produced with a view to proving the financial advantage which would accrue to a town of 100,000 inhabitants from the general adoption of the system I advocate. The cost of applying the system, including the necessary apparatus and reconstruction of premises, will be 10s per head of population, or for a population of 100,000, £50,000. The financial workings in such a town will be as follows:—

	£	s.	d.
To annual charge for interest on £50,000 at 4 per cent.	2,000	0	0
Cost of collecting night soil, say 12,000 tons, at 2s per ton	1,200	0	0
	£3,200	0	0
By value of 12,000 tons of manure (5s per ton) ...	3,000	0	0
Present loss upon collection and disposal	2,000	0	0
Advantage to ratepayers generally in saving of fuel, 20,000 tons, at 3s 4d...	3,333	6	8
	£8,333	6	8
Balance in favour of system	5,133	6	8
Add saving of water, if water system were adopted in lieu, say	3,750	0	0
Or a total annual gain of...	£8,883	6	8

In this statement the value of the manure is put at a low figure, but it will undoubtedly command a much higher figure when its agricultural value has been ascertained.

I hope I have succeeded in convincing you that the remedy I suggest possesses sufficient merit to give it a claim to general adoption, and so aid in fulfilling that excellent and now thrice repeated motto of your society that "*Prevention is better than cure.*"

(The quotations in this paper are taken from letters written by gentlemen who have had the closets in use for some time.

ADDENDUM.

THE SANITARY & ECONOMIC MANURE COMPANY

LIMITED,

Under the Directorship of

WILLIAM J. GARNETT, Esq., Quernmore Park, Lancaster,

H. M. FEILDEN, Esq., M.P., Witton Park, Blackburn,

J. CONYERS MORRELL, Esq., C.E., Leyland and Manchester,

Has been formed for the purpose of developing the scheme referred to in the foregoing pages, with any additions which in their progress the Company may from time to time find desirable for securing its perfection; and with the object of practically forwarding the same, they have established works for the construction and supply of MORRELL'S PATENT ASH-SCREENING CLOSETS, and other Sanitary Appliances.

The Company is prepared to contract for the fixing of the Closets throughout a town or district, or to supply the apparatus in complete or in skeleton form, or to grant the right to Sanitary Authorities and others to make and fix the Closets for themselves, on the payment of a small royalty.

In case the system is applied sufficiently in a certain district to give constant employment to the requisite staff, the Company is prepared to undertake the removal of the Closet Refuse free of cost, in which case the manure so collected will, of course, be the Company's property.

The Company confers with Sanitary Authorities on the special sanitary improvements required for their districts, both as regards drainage and other works, and advises thereon.

Further particulars may be had on application to the Sanitary and Economic Manure Company, Limited, Leinster Chambers, 6, St. Ann's-square, Manchester.

An examination of the Company's Plans will serve to prove that the expensive deep drainage system, referred to in the following, is quite unnecessary :—

Extract from Speech of the Right Honourable the Earl of Derby, January 9th, 1872.

"We are led to expect that something will be done for sanitary improvement; and of all agitations that can be set on foot or imagined, I can conceive none more entirely justifiable than an agitation for pure air, pure water, and freedom from poisoning from bad drainage—(Cheers). . . . But while I say that I am no advocate for rushing into vast and costly plans at the shortest notice—(hear, hear)—it is quite on the cards that the next generation may find out that the gigantic drainage works, on which so many millions have been spent, are comparatively useless, and what we want now is not so much a few schemes of national dimensions as a more minute and careful supervision of LITTLE LOCAL DETAILS, which do not make any particular show, but which, being looked after or neglected, constitute the whole difference between a healthy and an unhealthy district.—(hear, and cheers).

The following letters from eminent medical men are selected from the many received by the Company, approving of their work:—

"Belfast, 2nd February, 1873.

"DEAR SIR,

"The Dry Earth System, returning to the soil what is taken from the soil, is so consonant with common sense and induction from facts, that it must, I think, sooner or later, force its way.

"An article in the current Quarterly, "Exhaustion of the Soil in England," deserves your attention. The Dry Earth System is not only calculated to subserve agriculture, but to promote the interests of health as well. Even its advocates, however, do not for the most part themselves grasp in their entirety the merits of the question. If your Company will adopt in essentials the procedure which I set forth in the enclosed printed pages (*Journal of the Chemico-Agricultural Society, June 1st*, 1872.—"*The Loss of Ammoniacal Ingredients and Phosphates of Transition.*") they will not only advance the interests of the community, supplying the sanitary humus and arresting the phosphates of transition, but, I believe, lay the foundation of a vast success for years.

"I am, dear sir, yours very truly,

"HENRY MACCORMIC, M.D.,

"Consulting Physician to Belfast Hospital.

"J. Conyers Morrell, Esq."

"3, Hertford-street, May Fair, January 20th, 1873.

"DEAR SIR,

"I wish you all success in your good work. If prevention is better than cure in disease, it is no less so in sanitary matters.

"The Dry System goes to the root of the evil, and prevents the formation of sewage fluid, in its worst and nastiest form. It is only when human excreta are mixed and churned up with water that poisonous gases are generated, enteric fever diffused, rivers polluted, and public decency outraged. The Water Closet System is a delusion and a snare. It makes sewage, it is bad in principle, it connects each house with the sewers, as if on purpose to poison or offend the inmates with foul gases, it does not touch the fountain head, and it wastes a valuable fertilizer. It puts excrementitious matter into one end of a long tube, at the other end of which are found a congregation of civil engineers and chemists, frantically engaged in the vain work of undoing what has been done.

"I am, yours very truly,

"W. MOORE, M.D.

"J. Conyers Morrell, Esq."

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