THE USE OF TOWN WASTES AS A WAR MEASURE

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IT is now generally admitted that the growth of the large towns of the industrial era has deprived the soil of a great mass of organic waste that should go back to it.

It is also generally admitted that in modern war a well-fed and fertile soil is a great asset.

It is the object of this article to bring these two truisms together and see what case they make for the agricultural use of town wastes as a war measure.

Up to a century ago, it was customary for the nightsoil and refuse of the poorer parts of English towns to be piled in the streets and upon waste ground until carried off by farmers. There was no public sanitary system, and the historian, J. R. Green, states that as late as 1844 only two towns were known which had a public service for the poor. This service eventually developed into the hydraulic sewage system and the collection of other waste for burning or dumping.

Waste: achievement of civilization

No one has described what this change has meant to the soil more convincingly than the late F. H. King, Chief of Division of Soil Management, United States Department of Agriculture, in his famous book, *Farmers of Forty Centuries*, written before the war of 1914-18, but first published in England in 1926. Here only the estimated figures of the soil's loss can be given: 'On the basis of the data of Wolff, Kellner and Carpenter, the people of the United States and of Europe are pouring into the sea, lakes and rivers, and into underground waters, from 5,794,300 to 12,000,000 lb. of nitrogen, 1,881,900 to 4,151,000 lb. of potassium, and 777,200 to 3,057,600 lb. of phosphorus per million of adult population annually, and this waste we esteem one of the great achievements of our civilization. In the Far East, for more than thirty centuries, these enormous wastes have been religiously saved, and today the 400 millions of adult population send back to their fields annually 150,000 tons of phosphorus, 376,000 tons of potassium, and 1,158,000 tons of nitrogen comprised in a gross weight exceeding 182,000,000 tons. They are gathered in every home, alike in country villages and great cities.' King, after a fierce denunciation of 'man the most extravagant accelerator of waste the world has ever endured,' continued with the specific loss of phosphates due to hydraulic sewage, based upon a number of people like to that of the Far Eastern Mongolian people: 'Modern civilization is adding [to the loss of silt] that of hydraulic sewage disposal, through which the waste of 500 millions of people might be more than 194,300 tons of phosphorus annually, a waste which could not be replaced by 1,295,000 tons of rock phosphate, 75 per cent pure. The Mongolian races, with a population now approaching the figure named; occupying an area little more than one-half that of the United States; tilling less than 800,000 square miles of land, and much of this during twenty, thirty or perhaps forty centuries; unable to avail themselves of mineral fertilizers, could not tolerate such waste and survive.'

Dangerous deprivation in war-time

'Could not tolerate and survive': as far as language could convey a warning that all was not well with man in his brave, new, self-made, scientific and industrial world, these words conveyed it. Yet, though King by no means stood alone amongst soil specialists, the warning received little or no public attention. It was scarcely to be expected. The reading public were too urban-minded to be able to value it correctly, and the agriculturists themselves seemed to be too unaware of their own primal importance and too engrossed by the immediate problems of the land they were cultivating to realize its significance to them as a class and add their voices to the warning. They were, in any active sense, untouched by it. There, however, the words and the facts

stood, that under modern civilization the soil was robbed of its natural food and that the towns were particularly guilty in this unconscious crime. Civilized man, in his pride and progress, seemed to have forgotten that he remained terrene, the product of the soil.

It would, nevertheless, be clear that this deprivation would be more dangerous at a time of war. Great Britain had an experience of this, not known to her people at the time, but well understood by her Government, when, in the war of 1914-18, she stood within a few weeks of starvation. The Germans realized it when, though the war ended, the partial starvation, which it brought about, did not end. The supply of food and the home agriculture played a most significant part in the course of the war.

Lesson forgotten

Strangely enough, in Britain the warning of the war seemed to be quickly forgotten. In the following years of peace there was no great agricultural revival. On the contrary, Professor Stapledon stated in 1935 that 43 per cent of the land of England and Wales was 'in a more or less neglected condition—every single acre of this enormous area is capable of radical improvement.' In no country, indeed, did the significance of the war interpret itself in such words as those, which I have quoted from Mr King. As far as I have been able to find out, only one great town of Europe gave up its hydraulic system and reverted to turning its wastes into manure for the land. That town was Stockholm, the capital of Sweden with about half a million inhabitants.

It cannot, I think, be said that any nation after the war really faced the question of the use of town wastes. Artificial manures were regarded as a substitute, but they have not the physical effect of organic manures upon the soil. A number of tentative and successful experiments were tried with town wastes, but they were, and still are, the efforts of individual towns.

National support

Such towns, however, were given a national support in Britain in 1923. In that year, three years before the appearance of King's book in England, the British Ministry of Agriculture issued a leaflet (No. 398) on 'Town Refuse as Manure' for the limited reason that motor cars and lorries had driven horses from the roads with a consequent loss to the farmers of their stable manure. The leaflet recommended town waste as a substitute and named the following towns as selling wastes to farmers: London, Glasgow, Perth, Dundee, Aberdeen, Rochdale, Warrington, Bury, Sheffield, Hove and Gateshead. Of these Gateshead was the most thorough. Eighty per cent of the houses of Gateshead at that time had earth, not water, closets. Their contents, stable manure, slaughter-house refuse and other town waste, from which glass, metal and other hard substances had been removed, were together passed through a pulverizing machine and the crushed stuff sold at two shillings and six pence a ton. It was bought with eagerness. Two years ago I saw a number of mechanical plants for the use of town wastes in or near London. The Borough of Southwark has, since 1906, disposed of its household refuse by powdering it in a Lightning Crusher and selling it to farmers. The Borough of Kensington has an extensive plant for the manufacture of Hyganic. Outside London, Maidenhead and Leatherhead first crush refuse and then compost it with emulsions and sprays of sewage sludge. Other towns, which make use of town wastes, in the southern section of England are Harrow, St Albans, Birmingham and Colchester. Dr Garner estimated a few years ago that one-eighth of the sewage sludge, produced by treatment plants in England and Wales, was being used to increase soil fertility.

Sewage farms and the use of town wastes, therefore, show that there is a well-spread recognition that town wastes should *not* be wasted. They are too valuable. And when war comes, their value is yet greater. They can give additional soil fertility, which is an unquestionable addition of strength to countries at all times and especially at times of war. The German Government recognized this as regards the sewage factor of town wastes in its order to all municipalities to spend nothing on disposal works, until its use for increasing the food of the people had been met. The slogan had to be not 'sewage disposal' but 'sewage use.'

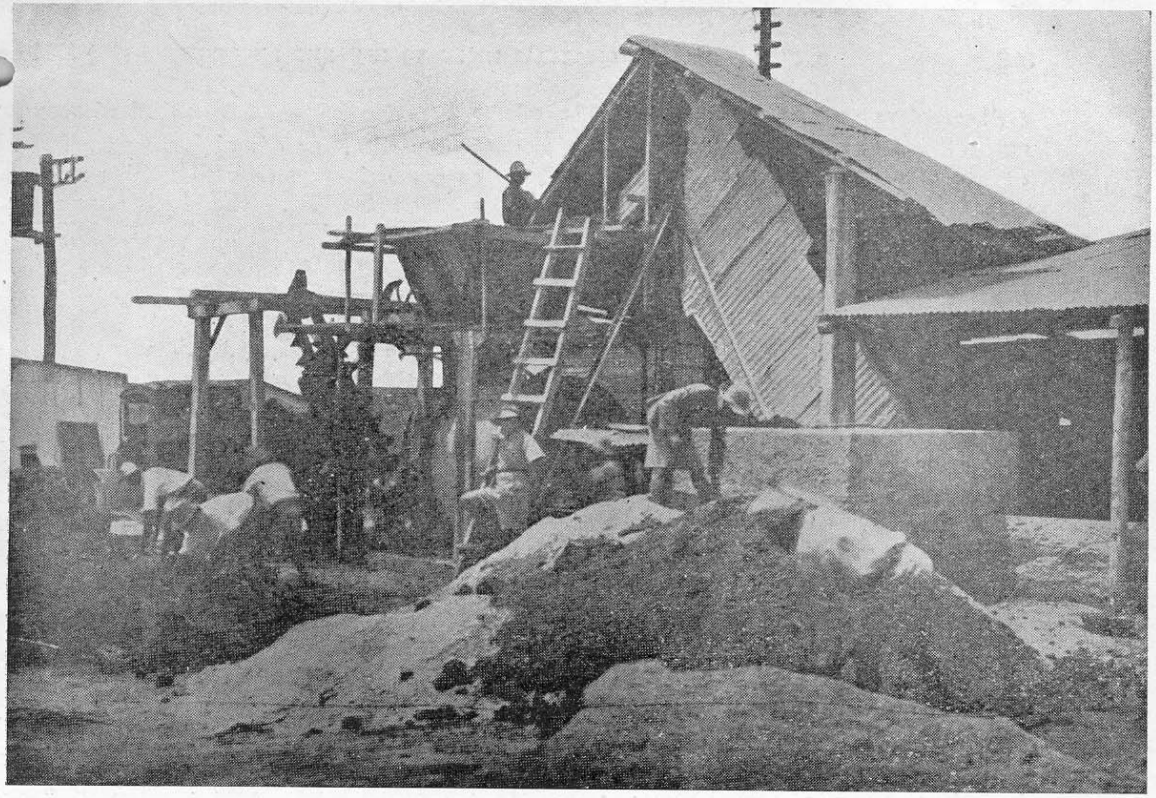
Progress in India

In India, now and in the past, the use of wastes has neither been so extensive nor so thorough as in the Far East. Messrs Jackson and Wad, in *The Indian Medical Gazette* of February 1934, wrote that though composting with nightsoil is in no way general in India, it is done in some areas. In the same issue of the *Gazette*, Mr J. J. Mieldazis, Sanitary Engineer, in an article entitled 'Organic Manure from Street Refuse and Nightsoil at Mysore City', wrote : 'The manurial value of a mixture of street rubbish and nightsoil is recognized to such an extent that agriculturists make periodic trips to the cities for the collection of these ingredients ; the agriculturist loads his cart with alternate layers of this heterogeneous mass of refuse and nightsoil and carts the mixture to his fields, where it is formed into piles and allowed to decompose for four to six months. When it is sufficiently broken down to an odourless humus mass, it is used as a fertilizer on the fields.' He added a description of how the municipal officers aided the conservation of the wastes and placed them at the disposal of the farmers. Since that date the Municipal Council of Mysore has itself composted its waste and nightsoil. Bangalore does the same, as also a number of towns in the Madras Presidency and in Travancore. The Bombay Municipality tests the composting of its sludge and refuse ; Nasik makes poudrette ; Jamshedpur activated sludge ; Ahmedabad is interested in refuse powdered by a crushing machine. Lastly, there are the towns that follow either the Indore or the Hot Fermentation methods. So one can marshall the following thirty towns as the vanguard of the use of town wastes for the soil : Mysore, Bangalore, Indore, Alwar, Rewa, Bharatpur, Datia, Neemuch Cantonment, Secunderabad Cantonment, Nanded, Tollygunge (Calcutta), Shahjahanpur, Sabour, Jaipur, Jodhpur, Madura, Cocanada, Conjeevaram, Tenali, Guntur, Tuticorin, Vizagapatam, Negapatam, Nellore, Alleppey, Jamshedpur, Nasik, Cawnpore, Ahmedabad and Bombay.

In increasing the use of wastes as a war measure, more rapid results can be procured from towns than from villages. But the use by villagers of their wastes, such as that brought about by propaganda in the Gurgaon district of the Punjab, is a measure of like kind. Artificial manures, which supply minerals that are deficient in the same way as some medical tonics supply deficiences in the case of invalids, have their share in promoting soil fertility as a war measure. However intricate their preparation may be, when they reach the cultivator, they are simple in application. Town wastes could reach the cultivators in an equally simple form. The methods in India of making them into manure, excluding the activated sludge process, are simple, and except where crushers are used, are non-mechanical and can be carried out by ordinary hand labour. Being simple, they do not take more than a few days to learn.

A war measure

The manure being made, the practical man sees many difficulties in getting it on to the land. But let us look at it at once as a war measure. As a war measure it would be given to local farmers as a war equipment in the same way as soldiers are equipped. Those of us, who have read such authoritative articles as that on banking and credit in the last, the fourteenth edition of the *Encyclopaedia Britannica*, believe that this can be done. Soldiers are creative in that they defend the people as a whole. They are indirectly creative as are hedges and fences, which, by keeping out marauding wild animals, make the cultivation of crops possible. Increased fertility is directly creative, being an increase of the source of life creation itself. In the soldier and the soil men must have faith in order to survive as a body politic. Credit is faith-money and all but a small percentage of money is now created as faith-money. Money, therefore, at a time of war has the function of equipping those measures of strength and safety, which are deemed necessary. If the increased fertility of the soil is recognized as one of these measures, a gift to the farmers of the equipment with which they can produce more and better products of the soil is practicable. It is probably also essential practically, for it is doubtful if the farmers would use the manure unless given as a war equipment.



Preparing town wastes at Nairobi

Fermentation of town wastes at Nairobi

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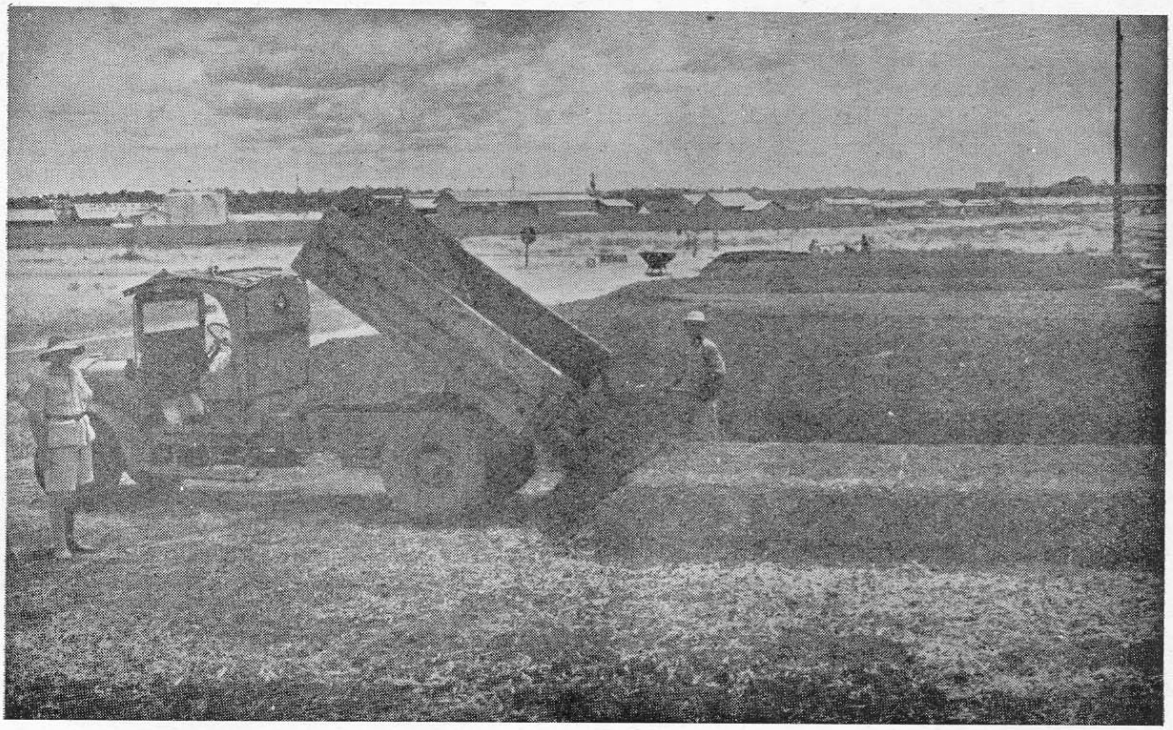
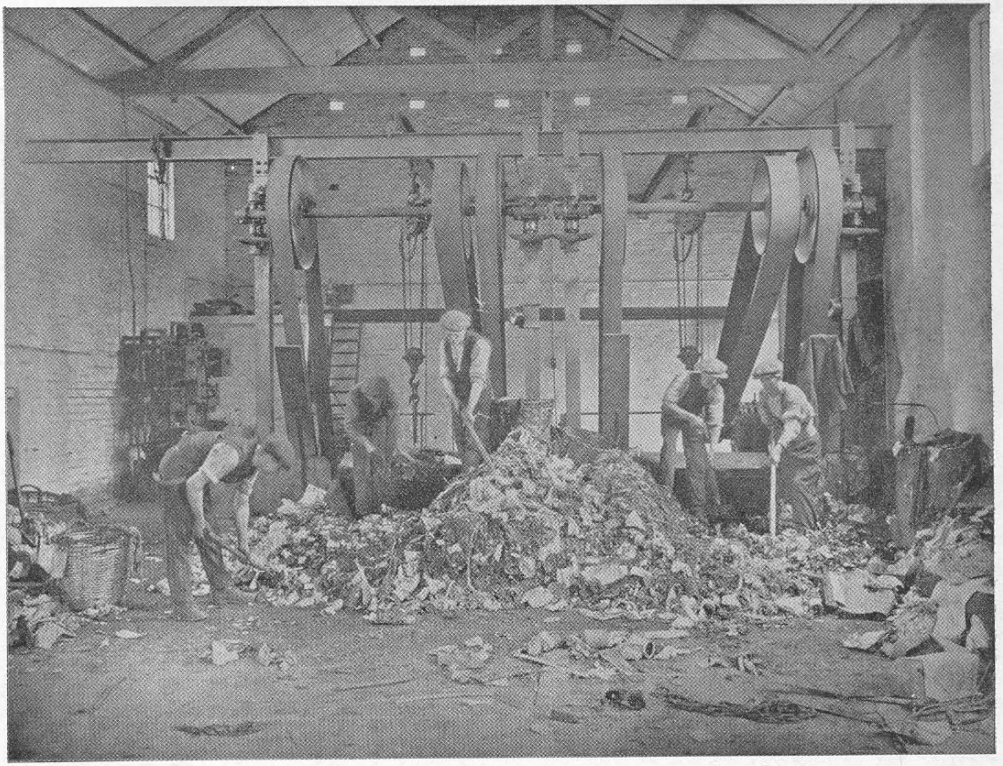
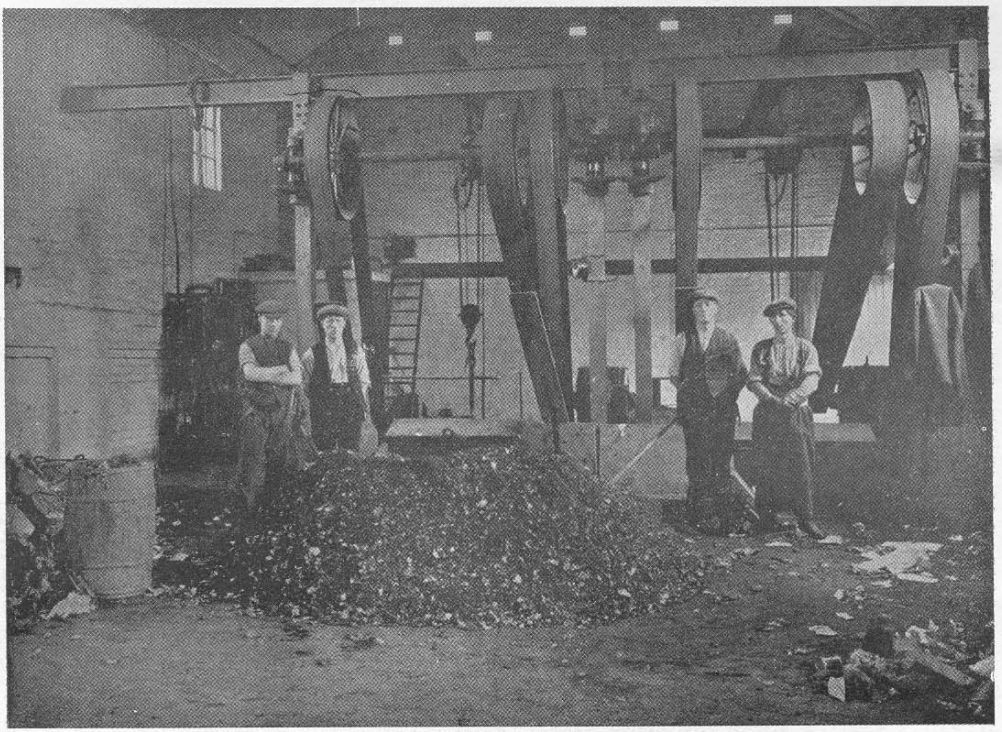


Photographs reproduced from 'The Manufacture of Humus from the Wastes of the Town and the Village', by Sir Albert Howard



Crude refuse being fed into a two unit plant erected in London

This photograph shows the same refuse after pulverization by the Lightning Masticator



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