

**MODERN METHODS OF
SEWAGE DISPOSAL, FOR
TOWNS, PUBLIC INSTITUTIONS
AND ISOLATED HOUSES**

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Modern Methods of Sewage Disposal, for Towns, Public Institutions and Isolated Houses by
George E. Waring

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BY

GEORGE EDWARD WARING, JR., M. INST. C. E.



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In the preparation of this book, it has been attempted to bring into convenient form, and within moderate limits, the more important results of the study and experience of many engineers, chemists, and biologists who have within the past quarter of a century exploited the various methods of sewage disposal. These results are set forth in a voluminous literature, and are clouded with much speculation and conflicting testimony.

It would not have been possible, even five years ago, to state with certainty some controlling principles which are now firmly established, and which are supported by the most successful practice of the past. That practice was based on empirical knowledge, and was the outgrowth of tentative effort. Little by little, it has been justified, elucidated, and corrected by scientific investigation, — notably at the hands of Schloessing, Frankland, Warrington, and the corps of able men who have conducted the experiments of the Massachusetts Board of Health at Lawrence. These experiments were more complete than any that preceded them, and their outcome has been more practically conclusive: they must be of world-wide good effect.

In one sense, the art of sewage disposal is now only at the threshold of its real success, for only now can we work

in the full light of day, divesting old processes of their defects, and devising new processes in accord with established knowledge.

While it is hoped that these pages will have some value and will offer some suggestion for engineers, they have been written with a view, as well, to the information of sewerage-committee men and others who may have occasion to look at the subject from the layman's point of view.

Especial attention is given, in the last two chapters, to the needs of isolated buildings, now so universally dependent on the noisome and death-dealing cesspool, which is, *facile princeps*, the great sanitary curse of the country.

The chapter on Chemical Treatment (XV.) owes its arrangement and its completeness to my secretary and friend, Mr. G. Everett Hill, whose untiring research and discreet selection I desire most cordially to acknowledge.

G. E. W., JR.

NEWPORT, R.I.,
April, 1894.

MODERN METHODS OF SEWAGE DISPOSAL.



CHAPTER I.

GENERAL CONSIDERATION.

THE life of man involves both the production of food, directly or indirectly by the growth of plants, and the consumption and destruction of the organized products of such growth. The production and the destruction are constant. Between consumption and renewed growth there intervenes a process which prepares what we reject for the use of plants.

It is this intervening process that we have to consider in applying the comparatively new art of sewage disposal. The process itself has gone on from the beginning of the world, but it has been left to unguided natural action, which takes no account of the needs and conditions of modern communities.

In the primitive life of sparse populations, it was comparatively safe to disregard it; but, as population became more dense, and especially as men gathered into communities, it became increasingly important to bring it under control, for it then involved a serious

menace to the safety of the people. So long as our offscourings could be scattered broadcast over the ground, their destruction was attended with little danger; but when it became necessary to concentrate them in underground receptacles, a capacity for real mischief was developed. As these receptacles increased, with the growth of communities, the menace increased, until, in the light of modern knowledge as to the conditions of healthful living, the need for radical measures of relief became obvious. It is the application of these measures that we are now to consider.

The sewerage of towns, and the drainage of important buildings, are now controlled by expert engineers, and they rarely fail to be reasonably well done. The economy of good plans is understood, and especially the vital necessity for good construction. In fact, it may be said that the adoption of excellent methods and appliances for removing liquid wastes from houses and towns is becoming general. It will in time become universal.

This, however, is only the first step in sanitary improvement. It is only the step of removal. It gets our wastes out of our immediate neighborhood; it does not destroy them. It is now recognized that quick and complete removal is only the beginning of the necessary service, and that proper ultimate disposal is no less important to health, to decency, and to public comfort. The organic wastes of human life must be finally and completely consumed. It is not enough to get them out of the house and out of the town; until