PROBLEMS IN WASTE DISPOSAL*

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THOUGH the questions of disposal of wastes have been under consideration for many years, it is comparatively recently that such have been submitted to careful engineering study and analysis.

The main factors to be considered in the disposal of municipal wastes are sanitation and discommodity—the first as affecting the health of the individual and of the general public, the second as affecting the individual or public in the matters of inconvenience, unsightliness and offensiveness.

In designing for a municipality, it is my opinion that the work should proceed along the following general divisions stated in the order of their importance:—

Factors to be Considered in Waste Disposal

Service.—Service requires that the apparatus and structures shall at all times be able to perform the duties imposed. In the case of waste disposal it means at all times required ability to collect, transport and dispose of in a convenient and sanitary manner all wastes produced.

Discommodity.—Discommodity or inconvenience relates to handling in a manner least disagreeable to, and entailing minimum effort on the part of, the individual or public.

Attractiveness.—Attractiveness in structures is desirable as its tendency is to make less acute any actual or imaginary odium attached to a plant, whereas neglect tends to magnify such.

Economy of Operation.—Economy of operation refers to the accomplishment of the work required in a most direct and inexpensive manner, having in view the obtaining of the greatest net monetary returns compatible with good sanitary and inoffensive operation.

Cost.—This factor is put last because it is assumed that any legislative body, appreciating the necessity of a function, will provide funds for the actuation of that function.

Often conveniences are demanded by individuals or the public, in utter disregard of the fact that such can not be had without commensurate expenditure of funds.

Economy in public works does not mean the apparent saving in moneys by the non-execution of a desired or required public improvement (so to speak, municipal deferred maintenance), but making each dollar appropriated go farthest in the execution of a necessary or desired public improvement.

Obviously, it is to the engineering professions that the public must turn if it is desired to have solved, in a logical and practical manner, the various intricate problems of municipal waste disposal.

Selection of a Garbage-Collection Unit

Having been selected chief of the technical staff, created on the recommendation of the city's Waste Commission, the necessary engineering and working forces, including waste investigators, were organized and systematic studies begun. At the same time, work on the design and construction of the municipal reduction plant, 95th Street incinerator, Bridewell crematory, and collecting and handling equipment was being carried on. To facilitate this work it seemed to me that somewhere

*Abstract of paper presented at a meeting of the Chicago Section of the American Society of Mechanical Engineers. along the line from the production of waste to the point of final disposal a unit should be selected. The most difficult phase of the entire problem is getting the garbage from the kitchen to the collecting unit.

It was for this reason that the garbage box was selected. The larger the capacity of this unit, other things being equal, the less the cost of collecting and handling. Study showed that a six-cubic-yard box when filled became too heavy for a two-horse team, except on the very best of paved streets. As but 13 per cent. of our alleys are paved and 62 per cent. of our streets, this prohibited such a unit being used throughout the city. So, taking all in consideration, the unit adopted appears to be the most satisfactory. This consists of a box 12 ft. long, 4 ft. wide, and 32 ins. high, as shown in Fig. 1.

Two such boxes can be loaded abreast, three in length and two vertically, making twelve boxes per specially designed railway car. One-half this number can be loaded



Fig. 1.—Garbage Box. Length, 12 Feet; Width, 4 Feet; Depth, 32 Inches

on a specially designed street car. The net loads of garbage contained will be approximately 34 and 17 tons, respectively.

By adopting a standard collecting unit, hoisting equipment, including cranes, runways and slings; hauling equipment, including wagons and tractors; transporting equipment, including railway and electric cars, steam and tow barges, become standards for loading and disposal stations for various wastes.

The studies so far conducted indicate that it may be considered an axiom that that system handling an offensive substance which exposes the least or fewest surfaces to contact with such substance is the most sanitary, least offensive and in general, commercially the best.

Table 1.—Cost of Garbage Disposal in Chicago for Five Years Previous to Acquisition of Garbage

| ost per ton |
|-------------|
| \$0.528 |
| 0.489 |
| 0.411 |
| 0.401 |
| 0.329 |
| \$0.420 |
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