

**RUDIMENTARY TREATISE  
ON THE DRAINAGE OF  
TOWNS AND BUILDINGS**

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Rudimentary Treatise on the Drainage of Towns and Buildings by G. Drysdale Dempsey

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**G. DRYSDALE DEMPSEY**

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RUDIMENTARY TREATISE  
ON THE  
DRAINAGE  
OF  
TOWNS AND BUILDINGS:  
SUGGESTIVE OF  
SANATORY REGULATIONS CONDUCTIVE TO THE HEALTH  
OF AN INCREASING POPULATION.

BY G. DRYSDALE DEMPSEY, C.E.,  
Author of "The Practical Railway Engineer," and of the "Rudimentary Treatise  
on the Drainage of Districts and Lands."

REVISED AND GREATLY EXTENDED: WITH NOTICES OF THE METROPOLITAN  
DRAINAGE, THAMES EMBANKMENT, AND WATER SUPPLY SCHEMES.

THIRD



EDITION.

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## PREFACE.

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Two volumes of the *Rudimentary Series*—"The Art of Draining Districts and Lands," and the work now submitted to the reader—relate to the subject of drainage generally, with water supply as an auxiliary or necessary contingent: the removal of surplus waters and refuse on the one hand, and the supply of pure water on the other. The one volume applies to *Districts and Lands*; the other to *Towns and Buildings*.

It becomes necessary to remark in this (the *Third*) Edition of the present work, that when the late Mr. Dempsey prepared the *First* and *Second* Editions, the whole subject of the *Drainage of the Metropolis* was in confusion. The most eminent engineers were in conflict as to the best mode of attaining the desired end. The plan eventually adopted, and now (1865) in progress, differs from that which Mr. Dempsey and many other engineers recommended. This, of course, is not conclusive as to the relative merits of the different schemes. Who were right and who were wrong, in these speculations, we shall not know for many years to come; until the Intercepting Main Drainage plan shall have had a fair trial by long-continued working. On this account it seems desirable to leave Mr. Dempsey's calculations and deductions in their original form; because they embody, or rather illustrate, one particular principle of Drainage, which may probably apply to many other large towns, irrespective of its adoption or rejection in the metropolis. By greatly enlarging the APPENDIX, space has been found for a succinct account of all that has been done in relation to the Main Drainage Scheme since the publication of the *Second Edition* of this volume, in 1854.

Plain facts are stated, without any prediction concerning the degree of success that may attend the operations now in progress. In a later portion of the APPENDIX, relating to the *Utilisation of Sewage*, it will be seen that this important question remains nearly in the same unsettled state as when Mr. Dempsey prepared the Second Edition. Much has been said, and much written; but the world has yet to learn whether the sewage of the great metropolis is to be rendered available as an agricultural fertiliser. We may here refer, for fuller information on this important subject, to another volume of this Series (Vol. 146), Mr. Robert Scott Burns' Rudimentary Treatise for Students of Agriculture, called, "Outlines of Modern Farming;" the fifth volume of those Outlines relates to Utilisation of Town Sewage, Irrigation, and the Reclamation of Waste Lands. The *Embankment of the Thames* being now recognised as an important feature in the Main Drainage Scheme, we have deemed it useful to devote one portion of the APPENDIX to this subject.

Another volume of the *Rudimentary Series*\* treats generally of Water Works, and the Supply of Water to Towns. It has been considered only necessary here, therefore, to notice briefly in the APPENDIX one or two advances which have been made between 1854 and 1865, in improving the systems sketched in the text by Mr. Dempsey, especially in regard to London and Glasgow.

LONDON, 1865.

\* "A Treatise on Waterworks for the Supply of Cities and Towns; with a Description of the principal Geological Formations of England, as influencing the Supply of Water; details of Engines and Pumping Machines for Raising Water; and description of Works which have been executed for Procuring Water from Wells, Springs, Rivers, and Drainage Areas."—By Samuel Hughes, F.G.S., Civil Engineer. Vol. 82\*\*\*

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# DRAINAGE.

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## DIVISION II.

### DRAINAGE OF TOWNS AND STREETS.

#### SECTION I.

Classification of Towns according to Position and Extent.—Varieties of Surface, Levels and Inclinations.—Application of Sewage Manure.—Metropolitan Sewage Manure Company.—Methods of treating Sewage.—Magnitude of London Sewers.—The Fleet Sewer.—Metropolitan Commission of Sewers.—The Tunnel Scheme.—Great London Drainage Bill.—Messrs. Stephenson and Cubitt's Evidence.—General Board of Health.

194. ACCORDING with our definitions (Part I. p. 1), we propose to treat of the *supply of water to towns and buildings* as a branch of the general subject of *Drainage*, since the purposes of the art cannot be effected without an adequate and regulated supply of water by a combination of natural and artificial agencies, the extended control over which constitutes the purpose of water-supply for all highway, manufacturing, and domestic uses.

195. The means of obtaining water for towns, and of conducting the drainage matters from them vary, mainly, according to their position with reference to the sources of water; and, in a subordinate degree, according to their superficial extent. The sources being those already enumerated in our First Part, viz. rivers, rains, and springs, the command of one or more of these will be presented as the most economical means of deriving the necessary supply for each town under consideration. Towns situated on the banks of tidal rivers, or in near proximity to them, may be

usually sufficiently supplied from these sources, unless some parts of the district extend upward to such elevation above the river-level that the raising of this supply requires expensive artificial power; in which case springs at higher levels may be advisably resorted to, or the drainage waters from superior lands may be so conducted as to assist the supply. Towns which are far distant from rivers are commonly entirely dependent upon springs or drainage waters for their artificial supply.

196. The refuse matters to be discharged from towns and buildings,—consisting of the disintegrated materials of street paving and roads; of superfluous rain water; of excrementitious matters, solid and liquid; of the waste products of combustion; of the refuse of animal and vegetable substances; besides the various waste matters used in manufactures,—require arrangements of different kinds to be provided with regard to the purposes to which these matters may be usefully applied. For such discharges of these matters as are to take place through subterranean channels, one principle is, however, common to all, viz. that the receptacle to which they are conducted must be situated at a level somewhat lower than that from which they are forwarded. The arrangements for this purpose will, therefore, be varied according to the nature of the site of the town. If this be low in relation to the surrounding country, and level, the refuse may be indifferently collected within or without the town, with, however, the advantage in the latter plan of avoiding such exposure of the decomposed matters as tends to pollute the atmosphere, and at the same time saving distance in the transfer of such portions of those matters as are destined for agricultural uses. If the site of the town be a valley with lower ground in the midst of it than is found anywhere without its limits, the readiest point of collection will be the lowest level in the town itself at which the drainage can be united, and artificial power will be required to distribute such matters as are intended for agricultural purposes around the higher ground outside.