

DRAINAGE ENGINEERING

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Drainage Engineering by Daniel William Murphy

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DANIEL WILLIAM MURPHY

**DRAINAGE
ENGINEERING**

DRAINAGE ENGINEERING

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DRAINAGE ENGINEERING

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PREFACE

The purpose of writing the following pages has been to present a general treatise on the drainage of agricultural lands. An attempt has been made to outline the various questions that should be considered in taking up a drainage problem, and to put into brief but comprehensive form the principles involved in the design and construction of drainage works.

The activities of the past few years intended to increase and improve agricultural areas through drainage, have greatly enlarged the application of engineering and scientific studies to this character of work. In addition to unwatering and reclaiming natural swamp and overflow lands, of which there are many millions of acres, principally in the humid sections of the United States, large drainage problems have developed and are still developing in the arid regions, as a result of irrigation. It has been estimated on irrigated lands generally that about one-fourth of the total area becomes unfit for profitable cultivation unless protected by drainage.

As a branch of Engineering, drainage presents many interesting and difficult problems. On account of the many varied and uncertain factors relating to soil and ground water conditions, it is difficult to formulate general laws governing many features of it. Each particular problem requires special study for economic and efficient results. The subject involves a study of the soil, hydrographic conditions, and also the location, design and construction of waterways for carrying away the excess supply. The effect of drainage upon the soil embraces questions of agriculture and soil physics. In every drainage enterprise economic questions are also involved.

The principles and methods I have endeavored to outline have been slowly developed through many years—even centuries. It is impossible, in most cases, to determine to whom the credit for them belongs. I have attempted, where possible, to give appropriate references throughout the text. Acknowledgment also is made to all whose writings I have read, to engineers whose cooperation I have had in working out drainage problems, and to many friends who have kindly assisted me in the work.

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