

**A RUDIMENTARY TREATISE ON FOUNDATIONS  
AND CONCRETE WORKS: CONTAINING A  
SYNOPSIS OF THE PRINCIPAL CASES OF  
FOUNDATION WORKS, WITH THE USUAL  
MODES OF TREATMENT; WITH AN ACCOUNT  
OF THE NEW MOLE EXECUTED IN BETON AT  
THE HARBOUR OF ALGIERS**

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A Rudimentary Treatise on Foundations and Concrete Works: Containing a Synopsis of the Principal Cases of Foundation Works, with the Usual Modes of Treatment; With an Account of the New Mole Executed in Beton at the Harbour of Algiers by E. Dobson

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**E. DOBSON**

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A SYNOPSIS OF THE PRINCIPAL CASES OF FOUNDATION WORKS, WITH THE  
USUAL MODES OF TREATMENT,  
AND PRACTICAL REMARKS ON  
FOOTINGS, TIMBER-PLANKING, SAND, CONCRETE, AND BÉTON,  
PILE-DRIVING, CAISSONS, AND COFFERDAMS;  
WITH  
AN ACCOUNT OF THE NEW MOLE EXECUTED IN BÉTON  
AT THE HARBOUR OF ALGIERS.

**ILLUSTRATED BY WOODCUTS.**

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AND OTHER WORKS.

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## PREFACE.

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ON the completion of the last of the four volumes which form my contribution to Mr. Weale's Series of Rudimentary Treatises, a few words on the circumstances under which they have been written may not be out of place.

The whole of these four volumes have been written whilst fulfilling professional engagements, the duties of which have left me no leisure for study or literary occupations, and from this circumstance not only has their publication been delayed to an extent that could not have been anticipated by Mr. Weale or myself, but I have been unable to give them that clearness of arrangement and completeness of detail which can only be attained by careful and leisurely revision. I hope, however, that although defective in style and arrangement, and in many points less complete than would have been the case could I have devoted more time to their composition, these volumes may prove of service to those to whom they are especially addressed, viz., to workmen and others engaged in the "Art of Building," who wish to obtain a general knowledge of the principles of their art, as a groundwork for the study of those particular branches to which their attention may be specially directed.

To those readers who may not have purchased the "Art of Building," it may be necessary to explain that

the present volume is written in continuation of the chapter in that work devoted to the subject of "Foundations," and is intended to give further information on those parts of the subject which could then only be touched upon very briefly. I may also observe, that many subjects which are treated of very fully in other volumes of the rudimentary treatises are here for that reason left unnoticed, or are merely glanced at in a cursory manner; as for example, the blasting of rocks, the nature and properties of limes and cements, the construction of travelling and other cranes, and of hoisting machinery in general.

In making the remarks on concrete, and the usual practice of builders in its use, which will be found in Chapter IV., I feel that great respect is due to the opinions of the elder members of the profession, with whom I am unwilling to differ; but in every observation of this kind which may be opposed to the usual routine of practice, I have written from my own experience, and from careful observation of works executed under my own superintendence, or to which I have had free access, and have been careful to advance nothing hastily, or without due consideration. Unfortunately the practices of the present generation of workmen are greatly of an empirical character, and have been handed down from one generation to another with little or no thought as to how far they are judicious, or in what respects they may be improved upon.

To assist in leading the workman to *think*, and to examine the principles by which the practical details of his work should be regulated, has been my principal aim in writing the volumes now brought to completion; and it will be a source of gratification to me hereafter, when engaged in devising new constructive arrange-



ments to meet the "engineering difficulties" of colonial practice, to think that the last moments spent by me in England have been devoted, however unsuccessfully, to the advancement of the skill and knowledge of the workmen of the mother country.

E. DOBSON.

London, Sept. 3, 1850.

# RUDIMENTARY TREATISE

ON

## FOUNDATIONS.

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### CHAPTER I.

#### SYNOPSIS OF THE PRINCIPAL CASES OF FOUNDATION WORKS, WITH THE USUAL MODES OF TREATMENT.

It may be necessary to premise, that by the term "foundation" we here mean all that portion of any structure which serves only as a basis on which to erect the superstructure, and not merely the work which may be requisite for the purpose of forming an artificial bearing stratum, in which restricted sense the word is often used. Thus we speak of "natural" and "artificial" foundations, meaning, in the one case, a solid natural stratum on which we may safely build; and, in the other case, an artificial bearing stratum of timber, concrete, faggots, &c., placed upon ground which of itself would be too soft to bear the pressure of a building, without some contrivance of this kind to distribute the weight over a large surface. The reader will therefore be good enough to bear in mind that, in the following pages, the term is used in its most extended sense.

The object to be attained in the construction of any foundation is, to form such a solid base for the superstructure that no movement shall take place after its erection. We must bear in mind that all structures built of coursed-masonry (whether brick or stone) will settle to a certain extent, and that, with a few exceptions, all soils will become compressed, more or less, under the weight of a building, however trifling its character. Our aim, therefore, will be not so much to attempt to *prevent* settlement, as to ensure that it shall be *uniform*, so that the superstructure may remain without crack or flaw, however irregularly disposed over the area of its site.

The principles to be kept in view in the treatment of all cases where the natural soil is at all of a doubtful character, may be thus briefly stated:—

1st. To distribute the weight of the structure over a large area of bearing surface.

2nd. To prevent the lateral escape of the supporting material.

Foundations may be divided into two great classes:—

Class I.—Foundations constructed in situations where the natural soil is sufficiently firm to bear the weight of the intended structure.

Class II.—Foundations in situations where an artificial bearing stratum must be formed, in consequence of the softness or looseness of the soil.

Each of these great classes may be subdivided as under, viz.:—

Division A.—Foundations in situations where water offers no impediment to the execution of the works.

Division B.—Foundations under water.