

**FOUNDATIONS AND  
FOUNDATION WALLS, FOR ALL  
CLASSES  
OF BUILDINGS, PILE DRIVING,  
BUILDING STONES & BRICKS**

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Foundations and Foundation Walls, for All Classes of Buildings, Pile Driving, Building Stones & Bricks by George T. Powell & Frederick Bauman

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**GEORGE T. POWELL & FREDERICK BAUMAN**

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## PUBLISHER'S PREFACE.

The subject of Foundations although treated of in various works on construction has not heretofore, with the exception of one or two small manuals, been made the subject of a special book. The importance of the subject and the liberal patronage afforded the first edition of this work had led the publisher to believe a second edition thoroughly revised and brought down to the present date would prove valuable to those engaged in designing and constructing large and important structures. After consultation with the author it was decided to recast the whole thing and make it practically a new work. With this in view it has been almost entirely rewritten and all new information bearing on the subject gathered into it.

We regret to say that the author after completion of his manuscript was stricken with paralysis and in consequence unable to give his attention to the revision of proofs. This matter, however, has been very carefully attended to, and we think will be found free from such inaccuracies, ambiguities and misprints as had crept into the first edition. Since the first edition was brought out there have been many important structures in process of construction where the subject of securing foundations was a serious study, among which might be named, the Brooklyn Bridge. The tests made for these structures and other knowledge gained regarding use of cements etc., have been carefully garnered and will be found under their proper headings in the following pages.

On the preservation of timber the author is largely indebted to the researches of Maj. Gen. Cram of the U. S. A., and has quoted largely from his lecture before the Franklin Institute in Philadelphia.

In order to cover the subject more fully than has been done heretofore the author has found it necessary to increase the number of illustrations and very much increase the amount of letter press.

The practical experience of the author and his careful collection of the materials of information on this subject leads us to feel that this book will prove to be a valuable aid to Architects, Builders and Engineers in solving the many difficult problems arising where important structures have to be erected on treacherous soils. Trusting that the same generous patronage will be accorded to it as heretofore we now offer it to the building and engineering fraternities.

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# CONTENTS.

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## CHAPTER I.

Foundation walls on soil or stratum not liable to be affected by weather, air or water.—Clay..... 9—12

## CHAPTER II.

Foundations in soft ground of considerable depth.—Boring to test bottom. — Timber pile foundations. — Foundations in quicksand. — Foundations in shifting sand. — Structures built on slopes.—Pile driving.—Terms used in pile driving.—Size and kind of wood for plies.—To find safe load for pile to carry.—Height of ram to fall.—Set of pile at last blow.—Weight of rams.—Experiments in Brooklyn Navy Yard.—Protection of piles.—Decay and preservation of timber.—Worms in wood on land and in open air.—Worms in wood under sea-water..... 13—32

## CHAPTER III.

Excavations.—Rule to be complied with.—Footings and footing courses.—Chimneys.—Trenches for footings.—Springs in cellars. 33—41

## CHAPTER IV.

Stone foundations.—Walls.—Brick for footings.—Use of stone for building purposes.—Strength of building stone.—Footing stones.—Inverted arches.—Table of weight of timbers.—Weight of building stones..... 42—53

## CHAPTER V.

Arches in walls.—Construction of arches.—Chimney walls and building the same.—Proportion of brick chimneys.—Masons' and stone-cutters' tools.—Stone-cutting.—Rubble footings.—Bond rubble. — Random coursed stone work.—Regular faced and squared stone work.—Trimmed and coursed Ashlar facing.—List of stones for the exterior of buildings.—Dry area of brick

or rubble.—Prevention of dampness in cellar walls.—Sylvester's process of repelling moisture from external walls.—Damp.—Hollow brick walls.—Floors in damp locations.—Air and water-tight cements for casks and cisterns.—Cement for external use.—Cement to resist red heat and boiling water.—Cement to join sections of cast-iron wheels.—Soft cement for steam boilers.—Gas-fitters' cement.—Plumbers' cement.—Coppersmiths' cement.—Composition to fill holes in castings.—Cast-iron cement.—Cement for Aquaria ..... 59—76

## CHAPTER VI.

Front vaults.—Retaining walls.—Slopes.—Table of strength of stone for vaults, galleries, etc.—Table of experiments on brick.—Table for calculating weight of materials in building.—Law in reference to load on floors.—Mensuration of superficies.—Hollow walls for buildings.—Building Laws passed Apr., 1871.—Preservation of stone.—Incrustations on brick walls.—Sulphuret of lime.—Sand ..... 77—97

## CHAPTER VII.

Preparation of common mortar.—Gravel sidewalks.—To color bricks black.—Staining bricks red or black.—Venetian cement. Coal-ash mortar.—Puzzolana mortar.—Dutch Terras mortar.—Plastering or stucco.—Inside plastering.—Two-coat work and finish. Stone mortar.—Stucco.—Scratch coat.—Slipped coat.—Cement for external use.—Asphalt composition.—Asphalt mastic.—Asphalt for walks.—Cement for fronts of houses.—Cement for tile roofs.—Cement for outside brick walls.—Mexican method for making hard lime floors.—Selenitic mortar or cement.—Selenitic clay.—Mixing selenitic mortar and concrete.—Proportion of sand to lime.—Concrete construction.—Ancient cements.—Rapidly of set.—Color.—Packing the cement.—Water for mixing.—Sand-gravel etc., for mixing with Portland cement.—Proportion of cement in mortar and concrete.—Mixing and laying Portland cement concrete.—Fineness.—Expanding or contracting in setting.—Strength.—Tests of cement.—Hydraulic limes and cements.—Salt-water mortars.—Mortars exposed to air.—Betons and concrete.—Portland cement.—French beton agglomeré.—Vicat cement.—Lafarge cement.—Table of American and Foreign cements.—Keene's cement.—Polished work of walls.—Stucco on brick-work.—Rosendale cement concrete.—Portland cement concrete.—Selenitic lime or cement.—Cement mortar for brick laying.—Mortar of cement.—Cement mortar for stone masonry.—Cement mortar for brick masonry.—Ordinary concrete.—Brick-dust and cement concrete.—Lime and cement concrete.—Table of tests of hydraulic and other cements



CONTENTS.

VII

at Centennial Exhibition.—Collingwood on cements.—Roman cement.—Vicat's hydraulic cement.—Stone cement.—Glue.—Cement mortar.—Concrete.—Test of Portland cement.—Street pavements.—Macadamized roadways.—Artificial stone pavements for sidewalks.—Belgian pavement.—Guidet pavement.—Sidewalks.—Method of calculating load on floors..... 98-145

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ART OF PREPARING FOUNDATIONS

BY

FREDERICK BAUMAN, (ARCHITECT.)

FIRST PART.

Art of treating the ground.—Solid grounds.—Compressible grounds.—Building-ground of Chicago.—Method of isolated piers.—Concrete.—Semi-fluid grounds..... 146-163

SECOND PART.

The Base.—Dimension stone.—Rubble stone.—Concrete.—Mortar.—Base of chimneys..... 163-166

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

# FOUNDATIONS AND FOUNDATION WALLS.

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## CHAPTER I.

### **Foundations.**

The term **Foundation** is used to signify the bed or bottom of earth, gravel or rock which must be prepared to receive the base consisting of footings and foundation walls. The object to be attained in the construction of all foundation walls is to form solid footings of proper proportion to the superstructure.

Foundations may be divided into two great classes.

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

Second.—Foundations in situations where artificial supports must be provided in consequence of the softness or looseness of the soil. Each of these classes may be subdivided into many kinds under the heading of Engineering works but it is the intention to confine this book more particularly to the foundations of buildings.

**Foundation Walls on Soil or Stratum not liable to be affected by Weather, Air or Water.**—In building on a natural bottom of this kind, it is necessary to level the surface or footing space, so that the walls or piers may start from a horizontal bed. If irregularities occur in the firm ground, it will be best to fill them up with concrete, rather than to use stone or brickwork. Where some portions of the foundations start below the level of the others, care must be taken to keep the mortar or cement joints as close as possible, or to execute the lower portion of the work in cement or hard-setting lime mortar.

Strong gravel may be considered as one of the best soils to build upon, as it is not affected by exposure to the atmosphere, and is almost incompressible and easily leveled.