PREFACE TO FIRST EDITION

That the technique of the art of designing reinforced concrete structures cannot be mastered solely by the study of books hardly needs to be emphasized, and no one realizes this fact more fully than the Authors of the present book. Coupled with study, practice under supervision is also essential. And this supervision may be of two kinds. There may be the constant vigilance of a master ready to indicate weak places, places where material has been wasted, and to suggest other designs, which would be more generally suitable. The alternative is the supervision under which the pioneers conducted their practice, that is, directly under Dame Nature, who still has to be consulted from time to time. Weak places were found by collapses of test pieces or structures, places where material was wasted were indicated by a falling-off in clientele, and a lack of success in competitive work.

Coupled, then, with practical work and experiment, upon which more is said in Chap. XIII., it is hoped that this work may prove helpful. A good deal of the matter is new, and several important considerations are taken into account which have hitherto been ignored, as far as the Authors are aware, in published literature on the subject. For example, it has long been realized that the bending moment for which beams should be designed cannot adequately be written down by any rigid formula, such as $\frac{wL^2}{12}$, as suggested by certain reports on reinforced concrete, but depends on such considerations as the ratio
of live to dead load, the relative stiffness of beams and columns, etc.; yet the present treatise is perhaps the first to subject these considerations to mathematical treatment and arrive at simple formulæ taking them into account. In the same way, it has been realized by some that columns are subjected to some bending action in addition to their direct load, owing to unequal loading of the floors. Some allowance is made for this in certain reports by specifying a lower stress in columns than in beams. It is shown in this book that this provision is in many cases utterly inadequate, while it is in a few cases excessive, and the mathematical investigations lead to comparatively simple formulæ, by which the stress due to bending may be calculated for any particular case. The question of resistance of beams to shear is also, among others, dealt with in a way which has far greater theoretical justification than commonly accepted methods.

But it is not claimed for the book that it obviates the necessity of the specialist. Because of the very great number of variables and the extraordinary choice of alternatives; the design of reinforced concrete is a hundred times more difficult than the design of steelwork, which commercial considerations have standardized to such an extent that the selection, for example, of a joist to do certain work may be made by reference to a table. With a concrete beam, you may use almost any depth and breadth you please, you may use a few large or many small bars, and no two designers will provide for shear, adhesion, etc., exactly alike. It is only, therefore, the fundamental considerations governing design that can be dealt with in a book, and we hope that our treatment will bring into prominence the principles underlying the practical design, which must remain more or less a compromise.

It is obvious that in practice many considerations must be considered which cannot be dealt with in a book of this kind, such as standardization of calculations and quantities, arrangements of reinforcement, and the many similar questions
which are essential to efficient, rapid, and reliable work, and are matters of importance to the engineering departments of large firms. Apart, however, from such questions of organization, an engineer will always require to be able to make accurate calculations, and it is hoped that this book may present the means to the solution of problems hitherto considered indeterminate.

The authors desire to record their indebtedness to Messrs. Taylor and Thompson for permission to reproduce Table IV., p. 104; to the Council of the R.I.B.A. for sanctioning the inclusion of the second report on Reinforced Concrete, as an appendix to this treatise; and to Prof. W. C. Unwin and W. Dunn, Esq., for allowing Appendices VII. and VIII. of that report to be given also.

OSCAR FABER.

P. G. BOWIE.

5, COLEMAN STREET, LONDON, E.C.,
February, 1912.

PREFACE TO SECOND EDITION

The reception of the first edition has induced authors and publisher to produce a second. In this, several minor corrections have been made, but it is not greatly changed.

Many of the formulae for bending moments in beams of many spans were adopted by the L.C.C. in their regulations for reinforced concrete frame buildings.

In Vol. II. are given much fuller treatments of bending moments in beams and columns, so that the moment in any
part of a beam or column, with any ratio of live to dead load, any distribution of load, and so on, may be found by simple inspection. This is what a draughtsman and designer needs in practice.

The following matter is treated in Vol. II. also: Unequal Spans of Continuous Beams, and a fuller treatment of the shearing resistance of concrete beams is given, based on Faber's later theoretical and experimental work on this subject.

Oscar Faber.

P. G. Bowie.

November, 1919.