# A COLLECTION OF PROBLEMS AND EXAMPLES ADAPTED TO THE "ELEMENTARY COURSE OF MATHEMATICS"

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649534838

A Collection of Problems and Examples Adapted to The "Elementary Course of Mathematics"
by Harvey Goodwin

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HARVEY GOODWIN

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Trieste

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BY THE

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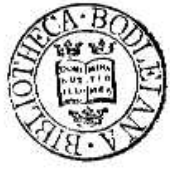
CAMBRIDGE:
*PRINTED AT THE UNIVERSITY PRESS,*
PUBLISHED BY J. & J. J. DEIGHTON;
AND SOLD BY
SIMPKIN, MARSHALL & CO., AND GEORGE BELL, LONDON.

M.DCCC.XLVII.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# PREFACE.

THE following pages contain a collection of Problems and Examples adapted to my "Elementary Course of Mathematics." The questions have, for the most part, been collected from Papers which have been set in the Senate-House or in College Examinations; some have been taken from various Collections which have been published in Cambridge and elsewhere at different times; and the remainder I have myself supplied. I have compiled, rather than invented, as much as the circumstances of the case allowed, not only for the purpose of saving my own labour, but because the questions are more likely to be diverse in kind, and therefore more generally illustrative of the subject to which they belong, when supplied from a variety of sources.

The subjects upon which Problems and Examples will be found in this book are, Algebra, Trigonometry, Statics, Dynamics, Hydrostatics, and Optics. Of the three other subjects which are treated in my Course of Mathematics, namely, Conic Sections, the first three Sections of the *Principia*, and Astronomy, I have given no illustrations, for the following reasons. I considered that the geometrical method of treating the Conic Sections was re-introduced into the University principally, if not entirely, as an introduction to Newton's geometrical method of treating Mechanics, and that this end was answered if the student perfectly mastered

the fundamental propositions, without gaining such familiarity with the methods of demonstration as to enable him to apply the same or analogous methods to miscellaneous Problems. Moreover, the power of applying geometrical methods will be found to be possessed only by persons of great natural mathematical taste, and therefore such application cannot be expected from those who only study the elementary parts of Mathematics. Again, the three sections of Newton's Principia did not seem, for this last reason, to give rise to many Problems suitable to the class of students for whom this Collection is intended. And, lastly, the portions of Astronomy specified in the Grace of May, 1846, are so very limited as to make it difficult to frame any considerable number of illustrative Examples.

Very good Collections of Problems and Examples illustrative of several of the subjects above-named are already in existence. I claim no superiority for the present, except its adaptation to the particular course of reading marked out by the Grace to which I have just now referred. All existing Collections, though they may contain questions adapted to the wants of a student whose reading is confined to an elementary course of Mathematics, such as that which my former work contains, have also, as might be expected, so great an admixture of Problems of a higher kind as extremely to trouble and perplex.

I have felt some doubt concerning the advantage of attaching answers to the questions proposed. In some instances such a course is manifestly undesirable, and

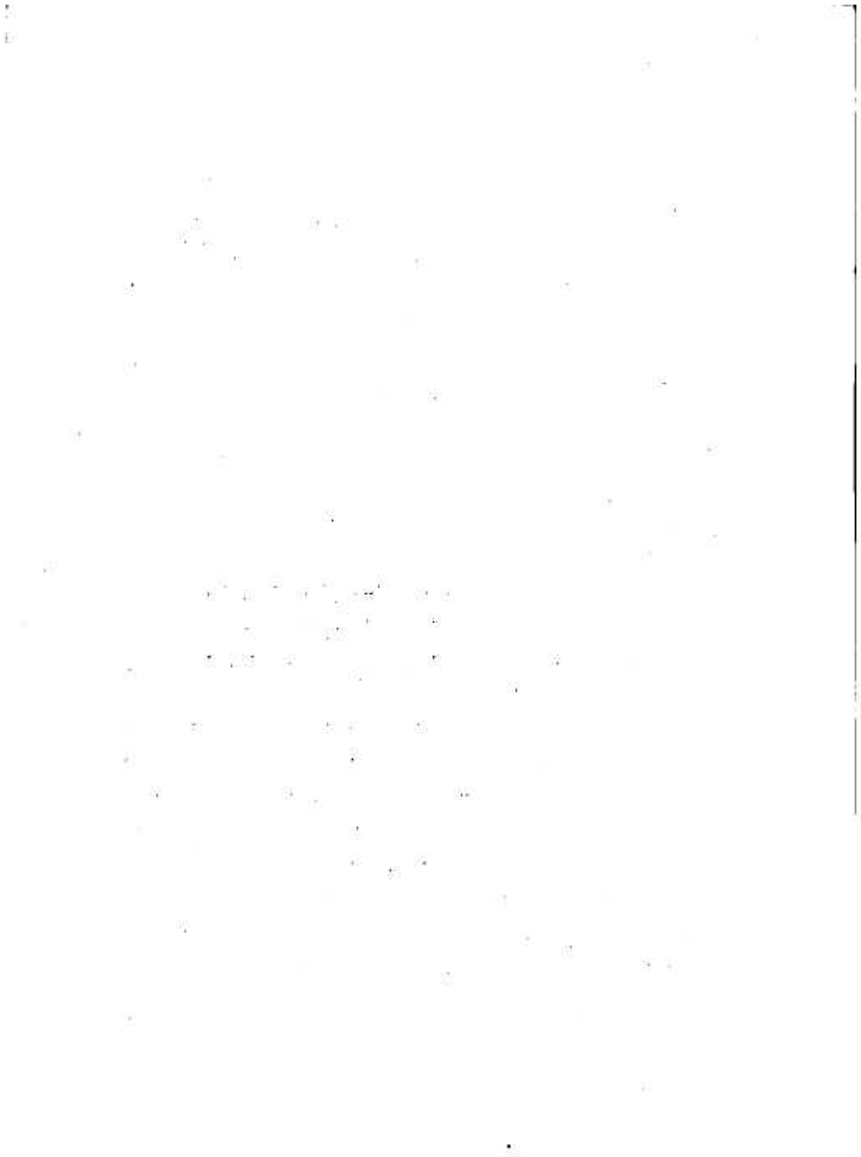
in many others it is doubtful. In the present Collection I have in general appended no answers, except to some of the algebraical questions, the answers to which are purely numerical; to work at a problem without seeing the result appears to me to be the more wholesome course for the student, partly because the form of the result may frequently give a hint concerning the Problem, and partly because the questions are so propounded in the Senate-House for which this Collection is only a preparation. I have however, I believe in all cases, myself worked and examined the Problems which I have admitted.

Certain of the questions require the aid of a table of logarithms for their solution; it will be understood therefore that the student is supposed to be in possession of such a table.

I cannot refrain from taking this opportunity of saying, that the extraordinary rapidity of the sale of the "Elementary Course" confirms me in the opinion I entertained of the necessity which existed for such a work, and at the same time gives me ground for hoping that my book, notwithstanding its defects, which are many, has in some measure answered the purposes for which it was written. I trust that the present little work will be found a useful supplement to the other.

H. GOODWIN.

CAMBRIDGE,
*April* 12, 1847.



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