ELEMENTARY STATICS, PRINCIPALLY DESIGNED FOR THE USE OF CANDIDATES FOR THE FIRST AND SECOND CLASS CERTIFICATES, AND FOR THE INTERMEDIATE EXAMINATIONS; WITH NUMEROUS EXAMPLES AND EXERCISES

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Elementary statics, principally designed for the use of candidates for the first and second class certificates, and for the intermediate examinations; with numerous examples and exercises by Thomas Kirkland

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THOMAS KIRKLAND

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WITH NUMEROUS EXAMPLES AND EXERCISES.

BY

THOMAS KIRKLAND, M.A.,

Science Master, Normal School, Toronto.

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PREFACE.

THE following pages contain the substance of the lectures on Statics, delivered to the students of the Second Division in the Normal School, Toronto, during the past five years. They are now published in compliance with resolutions passed at several Teachers' Associations, and at the request of many excellent teachers in High and Public Schools.

Throughout the book, I have constantly kept in view the requirements of Candidates for Second Class Certificates and for the Intermediate Examination, who have not, in general, obtained the knowledge of mathematics, which most elementary books on Statics presuppose. In the perusal of the following pages, which will be found to contain all that is usually comprised in Elementary Treatises on Statics, the only thing required of the student is a competent knowledge of the First Book of Euclid and simple equations in Algebra.

Each chapter is divided into sections with the same fundamental idea running through the section. The student will not, therefore, be perplexed by trying to learn too much at once, but will be obliged to fix his attention on one subject at a time.

He will thus the more easily master the difficulties it presents. Each section contains one or more examples fully worked out; and amongst the answers, at the end of the book, very full hints are given for the solution of all the more difficult problems. These features, it is hoped, may be of service to those who study the book without the aid of a teacher. To each section is appended a collection of questions and problems designed to test the student's knowledge of the subject-matter of the section, to awaken activity of thought, and to exercise his invention in the solution of problems by the application of the principles contained in the section. Great pains have been taken in constructing and selecting the questions for the different exercises. The object has been not to select intricate and puzzling questions, but such as will serve to determine from the form of solution, whether the student has grasped the fundamental principles of the particular subject, and is capable of applying them. As a guide to beginners the more important propositions have been printed in black-letter type, the less important in italics.

Throughout the work I have endeavored to explain as clearly as I could the leading ideas of Elementary Statics and to get rid of all difficulties that are not inherent in the subject itself. But it may be well to remind the student that after all that is possible has been done in the way of exposition and illustration, the subject will still present difficulties to beginners—difficulties which can only be overcome by the labor of close thinking.

Students unfamiliar with geometrical deductions are recommended, at the first reading, to omit the following:

Exercise III., Chapter II., and Sections II. and III., Chapter III.; Sections I. (except the Introduction), III., and Exercise IV., Chapter VI.; Section III., Chapter VII.

After reading the chapter on the Mechanical Powers, the student will be better able to master the omitted sections. By this division into sections, it is hoped that the book has been adapted to the requirements of beginners as well as to the wants of advanced students.

I have to tender my thanks to several friends for suggestions and assistance which have been of the greatest service to me, and particularly to Professor Young for suggesting several important improvements in the work, and for the excellent collection of Examination Papers in Chapter XII., which add much to the value of the book.

Any remarks on the work, and especially indications of errors, omissions, or difficulties will be thankfully received.

It will give me much pleasure if these pages shall in any way contribute to advance the taste for a science that is at once useful and interesting.

THOMAS KIRKLAND.

Normal School, April 1877.

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