

**NATURAL
PHILOSOPHY,
PART I**

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Natural philosophy, part I by John Herbert Sangster

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JOHN HERBERT SANGSTER

**NATURAL
PHILOSOPHY,
PART I**

LOVELL'S SERIES OF SCHOOL BOOKS.

NATURAL PHILOSOPHY,

PART I,

INCLUDING

STATICS, HYDROSTATICS, PNEUMATICS, DYNAMICS,
HYDRODYNAMICS, THE GENERAL THEORY OF
UNDULATIONS, THE SCIENCE OF SOUND, THE
MECHANICAL THEORY OF MUSIC, ETC.

DESIGNED

FOR THE USE OF NORMAL AND GRAMMAR SCHOOLS, AND
THE HIGHER CLASSES IN COMMON SCHOOLS.

BY JOHN HERBERT SANGSTER, M.A.,

MATHEMATICAL MASTER AND LECTURER IN CHEMISTRY AND NATURAL
PHILOSOPHY IN THE NORMAL SCHOOL FOR UPPER CANADA.

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Canada.

PREFACE TO FIRST EDITION.

THE following Treatise was originally designed to serve as a hand-book or companion to the lectures on Natural Philosophy, delivered to the junior division in the Normal School. Although numerous text-books on the subject were already in existence, it was found that they were either too abstruse and technical for beginners, or too general and superficial to be of much practical use. The aim of the present little work is to occupy a position between these extremes—to present the leading facts of the science in a form so concise as to be readily remembered, and at the same time to give that thorough drilling upon the principles which is absolutely essential to their full comprehension.

As a hand-book to lectures fully illustrated by apparatus, it was not necessary to introduce many wood-cuts, and accordingly they have been given only where absolutely required.

The chief peculiarity of this book consists in the introduction to a large extent of problems calculated to impart that intimate and practical knowledge of the facts and principles of Mechanical Science, without which the student's information on the subject is, comparatively speaking, useless. How frequently do we meet with a pupil who has read carefully through one of the common text-books on Natural Philosophy without acquiring any very clear or definite ideas of the science! And what should we say of a work professing to

teach the principles of arithmetic or algebra by mere rules and explanations, without an appropriate selection of examples and problems? The exercises are therefore deemed an important feature of the following pages, and it is thought that the science may be taught by their aid more thoroughly and in less time than otherwise.

TORONTO, January, 1860.

PREFACE TO SECOND EDITION.

The proof sheets of this edition have undergone the most attentive revision at the hands of the Author. He has added a section on the Turbine Water Wheel, a chapter on the Theory of Undulations, another on the Science of Sound, and a third on the Mechanical Theory of Music. The Author trusts that these additions will render the work more serviceable and more deserving of that flattering reception which has been already accorded to it.

TORONTO, February, 1861.

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