ADAMS'S MENSURATION; MENSURATION, MECHANICAL POWERS, AND MACHINERY

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Trieste

ADAMS'S MENSURATION.

MENSURATION,

MECHANICAL POWERS,

AND

MACHINERY.

THE PRINCIPLES OF MENSURATION ANALYTICALLY EXPLAINED, AND PRACTICALLY APPLIED TO THE MEASUREMENT OF LINES, SUPERFICIES, AND SOLIDS; ALSO, A PHILOSOPHICAL EXPLANATION OF THE SIMPLE MECHANICAL POWERS, AND THEIR APPLICATION TO MACHINERY.

DESIGNED FOR THE USE OF SCHOOLS AND ACADEMIES.

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PREFACE.

More than nineteen twentieths of the children in our country receive all their education in the common schools. And but about one half of the number who attend the high schools and academies, ever go further in a course of mathematical study than through the elements of Algebra and Geometry. Hence, of the whole number of scholars in all the schools in our country, not more than one fortieth ever acquire as much knowledge of the principles of Mensuration as is actually needed for the every-day business of life.

Now, this is manifestly wrong. Every person, and more especially every young man, should possess sufficient knowledge of the principles of Mensuration to enable him to transact his business independent of arbitrary rules, or of the assistance of those who, having been more fortunate than himself in acquiring a knowledge of these principles, render the necessary aid only for a stipulated sum.

But wherein lies this evil? It is not in the want of treatises upon Mensuration; for the world is well supplied, upon this subject, with text-books abounding in mechanical rules. Neither is it in the want of facilities for acquiring a thorough mathematical knowledge; for the doors of our high schools, seminaries and colleges, are open alike to all who may choose to enter. The rules and principles presented in most of the text-books heretofore written upon this department of education, are mere directions for the performance of a mechanical process, which, if followed, will "bring the answer."

The reason generally given for thus presenting them is, that the principles involved cannot be understood without a thorough knowledge of Geometry. But this is not so. A great majority, nay, nearly all of the rules and principles involved in Mensuration as applied to the actual business of life, admit of an analysis perfectly comprehensible by the mere arithmetician.

The evil must be, then, in the want of *the proper kind of text-book*; — one that shall give the *why*, as well as the *how*; one that shall be adapted to the capacity of the student who has no knowledge of mathematics beyond Arithmetic.

Such a work, it is believed, is here presented to the public. The characteristics of the work are the following:

1. *It is an analytical work.* No rule or principle is introduced as mechanical, that admits of an analysis intelligible to the mind of the thorough arithmetical scholar. After the number of rules that admit of such an analysis are taken from the whole number contained in the work, it leaves but *a very small number* of arbitrary mechanical rules.

2. *The arrangement is natural and philosophical.* The subject of Weights and Measures is first considered, for the reason that nothing can be measured without reference to some established standard of weight or measure. The Geometrical Definitions, necessary to be understood by the pupil in pursuing this study, are next introduced; and these are followed by a number of important Geometrical Problems. The Mensuration of Lines and Superficies is then presented, and next in order follows the Mensuration of Solids; care being taken in all cases to present the various rules in their most natural order. The Simple Mechanical Powers are next considered; and the work closes with an application of the Mechanical Powers to machines, and an examination of some of the important principles of Machinery.

4. *The "Topic Method" of questioning*, which was followed in "Adams's Book-keeping," having been received with much favor, is adopted in this work. This method points out something for the pupil to do, and *it also requires him to do it.*

4. In the analysis of the various principles, and in the examples for practice, care has been taken to avoid the extremes of analysis and synthesis. The work is therefore neither so obscure as to be unintelligible to the majority of pupils, nor so puerile as to leave nothing upon which the active and inquiring mind may exercise and improve itself.

5. The analysis of many of the rules and principles, and the peculiar manner in which the subjects generally are presented, are believed to be original. The Encyclopædia Britannica, North American Review, the works of Dr. Lardner, Galloway, Coulomb, Rennie, Willis, and Gregory, and many of the first teachers, machinists and mechanics, in New England and New York, have been consulted in the preparation of the work.

The work contains just the kind of information required by the mass of people throughout the country; and it is confidently hoped that its arrangement, and its adaptation to the best and most approved methods of teaching, together with the importance of the subject, may secure for the work a place in the course of instruction in all our schools and academies, though it be, in some cases, at the expense of some of the higher but less important branches.

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