

**AMERICAN
ELEMENTARY
ARITHMETIC**

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American Elementary Arithmetic by M. A. Bailey

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M. A. BAILEY

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ELEMENTARY ARITHMETIC

BY

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PREFACE

THIS book is intended to cover the first five years' work in arithmetic; it is the first of a two-book series, of which the second is the "American Comprehensive Arithmetic." It is divided into two parts: Part First, for primary classes; Part Second, for the three succeeding grades.

The work is based upon the psychology of number. The need or demand which gives rise to each cumulative step in mental activity has been considered, and exercises have been prepared to develop this activity in harmony with the laws of the mind. Thus, after the pupil has learned how to find the value of $6 + 6 + 6 + 6$ by addition, his attention is called to the need of a shorter process, and he is introduced to multiplication by a method founded upon this demand. Psychology requires also that the relations of "what is given" and "what is required" shall be clearly ascertained as a basis for deciding upon the plan of procedure. These relations are not confined in this book to *ratio* alone; *i.e.*, to *how many times* one quantity contains another, but are extended more broadly to *how much* one quantity exceeds another.

It is now recognized that suitable apparatus is as necessary to the teacher of primary arithmetic as to the teacher of the physical sciences. The apparatus called for in this book consists of paper, pasteboard, etc., and of toy money, blocks, and splints, which may be prepared by the teacher, or obtained of any dealer in kindergarten materials.

Attention is called to the educative value of the illustrations. The attempt has been made to present every subject twice: first,

in the universal language of pictures; and second, in the particular form of printed words. Thus, on p. 29, the boys in the picture are seen to separate a whole of two objects into parts, and to unite the parts again into the whole. In printed words, the pupils are again instructed to perform the same operations.

In the first chapter, mathematical conceptions are developed in the order in which they arise in the consciousness of the child. At first, the emphasis is on mathematical judgments, relations, etc., without specific regard to number, or numbers as such. Thus, the first lesson develops the idea of "one or more than one" by questions based on the picture, such as, "Is there one girl or more than one?" Next comes a lesson on "how many by objects" with such questions as, "Hold up as many fingers as there are dolls on the floor." The next step is, "how many by words"; and the next, "how many by symbols." Then come in turn the ideas of "how much," "how much larger," "how many times," "how many times as large," "what part," and "what order." All this is introductory work designed to develop inductively, to present step by step a mathematical vocabulary, and to form a habit of clear mathematical thinking.

In succeeding chapters, the laboratory plan has been carefully followed. This plan has been carried out through the latest methods which have successfully met the test of actual trial in the schoolroom. In teaching the fundamental operations, the Grube method has not been pursued, but each operation has been so presented by itself that the teacher may follow the Grube method or any of its modifications by a judicious selection of the sequence of pages. The laws of apperception have been followed throughout. In every case, the pupil has been asked to consider what he already knows before he has been introduced to the unknown. The pupil has been taught to strive constantly for a view of the subject as a whole and to seek after general truths.

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PART FIRST



SIMPLE JUDGMENTS

One or More than One



- Is there one girl or more than one ?
- Is there one doll or more than one ?
- Is there one boy or more than one ?
- Are there more boys than girls ?
- Are there more boys than dolls ?
- Are there more dolls than girls ?
- Are there more or fewer boys than girls ?
- Are there more or fewer girls than dolls ?
- Are there many or few bricks in the wall ?
- Are there many or few marbles in the ring ?

NOTE.—The pupil is expected to answer such questions as these before he can read. With book in hand he may look at the picture, or he may be asked about other objects. These questions are meant to be suggestive of others.

How Many—By Objects*Hold up as many fingers :*

- As there are dolls on the chair.
- As there are dolls in the bed.
- As there are dolls on the floor.
- As there are dolls with hats.
- As there are dolls lying down.

Place as many splints :

- As there are dolls in the bed.
- As there are dolls lying down.
- As there are dolls on the floor.
- As there are dolls sitting up.
- As there are dolls with hats.

Make as many marks :

- As there are dolls without hats.
- As there are dolls with hats.
- As there are dolls on the floor.
- As there are dolls in the chair.
- As there are dolls in all.