

**CHILDREN'S ARITHMETIC
BY GRADES. FIRST BOOK
NUMBERS**

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Children's Arithmetic by Grades. First Book Numbers by William E. Chancellor

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WILLIAM E. CHANCELLOR

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CHILDREN'S ARITHMETICS BY GRADES
GLOBE SERIES

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FIRST BOOK
NUMBERS

BY

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M. P. 1

"If a child learns how to use the text-book, he learns how to make use of the experience of mankind. The text-book enables the child to do individual work for himself, and helps him to become independent of oral teaching."

W. T. HARRIS, LL.D.

United States Commissioner of Education.

MANHATTAN PRESS
474 WEST BROADWAY
NEW YORK

PREFACE

FOR boys and girls who know the numbers from one to ten thoroughly, there is here about a year and a half's work.

When should boys and girls begin to study numbers in books? As soon as books can help them forward to the mastery of numbers. This time comes as soon as children can read.

How should boys and girls study numbers? The interrelations of number-facts and of number-principles are such as to make progress very slow and very difficult through their intricate maze. Is there any Ariadne's thread to follow through the labyrinth of numbers?

Is number ratio or counting? Is it comparison, or magnitude, or multitude? Is it a logic of thought, which can be analyzed after the topical style, — addition, subtraction, multiplication, division, rule of three, and so forth, — of which we may complete one part before beginning the next? Shall we learn every discoverable fact about twenty before taking up twenty-one, or every conceivable fact about $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$ before taking up liquid measure?

This book is neither "topical" nor "spiral" in plan. Its substance is neither ratio nor counting. Its purpose is to conform numbers in their facts and principles to the usual processes and powers and interests of children's minds. The graded reader has opened the way for the graded arithmetic. Grading all books is part and parcel of the new education, which means to discover and to obey the facts of the child-mind, its methods, nascent periods, and order of growth.

The core of the concentric theory is recognition of the value of finding something that is known even in the mass of the unknown. Let us not hesitate in schoolbooks as we do not hesitate in life to branch out into the new and to return again to the old. Because comparing is the root and numbering is the top, let us not forget reasoning which is the main trunk of arithmetic. The child's knowledge of arithmetic should grow as evenly in all directions as the most careful and the most open-minded education can secure.

Progress in education is largely a matter of progress in power to understand books. Oral instruction may be continued too long as the sole medium for imparting knowledge. This book is rather for reading and study than for the setting of many exercises in writing figures. It calls for oral expression far more than for written work; but it is meant to call most for the quiet, studious effort of the child to think through the number-processes for himself in the light of the instruction of the teacher and of these pages. Many minds, of adults as well as of children, cannot at once comprehend principles and facts explained orally. We often need to see the printed words, and slowly and patiently to think out their truth and meaning for ourselves. We remember with more than twofold certainty what we have verified for ourselves after hearing from others.

The value of numbers in real life is such as to warrant illustrations in the pages of text-books, both in topics, such as the clock, thermometer, calendar, and house address, and in pictures, which add to number the same interest they add to reading. Children are not alone in their frequent inability to realize in imagination a word-picture. Teachers are entirely justified in asking for their endeavor to awaken children to vigorous mental life the attraction of illustrations, and ought to seize every opportunity offered by arithmetic for training them to see, to image, to compare, and to represent the visible realities of the world.

Author and publishers desire to acknowledge the valuable suggestions of Principal W. B. Gunnison, Ph.D., of Erasmus Hall High School, Brooklyn, N.Y., in reviewing the proofs of these pages.

W. E. C.

BLOOMFIELD, N.J.,
March 25, 1901.

SUGGESTIONS TO TEACHERS

1. The preface explains the general purpose of the book.
2. Read the book itself. The purposes of certain special features will appear only when seen in relation to other features.
3. Do not hesitate to use in advance of the order in the book facts which appear later in these pages.
4. While the purpose of number-study is to learn numbers, oral language expression needs to be encouraged. Develop the number-story features of early primary work as much as time permits. The speaking of English sentences tends to promote that rational understanding of number-processes which is the end of Arithmetic as a science.
5. See that the children do study this book, but do not ask them to study quietly over a quarter of an hour at any one time. Children tire quickly and recover even more quickly.
6. Drill for the sake of instant accuracy; but do not follow any drill to the point of over-fatigue. Take great care not to drill upon things not essential.
7. This book is only a collection of suggestions; it is not an encyclopedia of devices. Seek great variety in methods and devices. There are children who will not learn things in our ways. Try to find their ways of understanding number-facts and number-principles. Since historically our decimal system of counting by tens has grown from our having ten fingers, and since the authority of modern mathematical philosophy distinctly asserts the naturalness of counting upon the fingers, such counting should be permitted as a helpful stage in number-progress, but not to the extent of establishing a physical automatism.
8. Every child has peculiar interests. Find them. For number-stories use facts which interest the various children. Remember that children have their "good" and their "bad" days. On their good days children sometimes learn an amazing amount of new matter.
9. A boy or girl may be ready to undertake harder work than this book offers before knowing this book from cover to cover. Yet we should not forget that doing easy things over and over begets confidence, which supports us in our attacks upon new and harder problems.
10. Neatness in writing tends to accuracy in all number-operations.

LESSONS

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