AMERICAN MENTAL ARITHMETIC

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American Mental Arithmetic by M. A. Bailey

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M. A. BAILEY

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MENTAL ARITHMETIC

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BAILEY'S MENT. AR.
E-P 12

PREFACE.

In the solution of problems there are two distinct steps — the selection of the operations, and their performance. Mental and written arithmetic agree in that the choice of operations is determined in the same manner; they differ in that the operations are wholly mental in the one, while external aids are used in the other. Mental arithmetic should, therefore, embrace all cases in written arithmetic except those which teach how to add, subtract, multiply, and divide large numbers. This arithmetic is intended as a drill-book in which the principles of written arithmetic, except those mentioned above, shall be concisely stated and illustrated. The examples and problems are such as the average mind should be able to solve readily without a pencil.

He who teaches by the printed page must use every artifice of arrangement to make his statements clear and attractive. The placing of principles and illustrations in parallel columns aids the student to grasp the subject as a whole, since each column may be read independently, and each conveys the same thought in a different manner. The beginning of each subject at the top of a page, the systematic placing of explanations and directions under exercises, and the continuous numbering of all the examples in a chapter, aid the teacher to *announce* and the pupil to *understand* the requirements.

In Addition, the combination method is made prominent. The number of seconds which should be required for the solution of each example is stated after each exercise. Since ninety per cent of all arithmetical computation in the work-shop, farm, and counting-room is Addition, this subject cannot be too zealously pressed. Many who have broken the habit, in adding, of saying "6 and 8 are 14 and 6 are 20," are still saying in subtracting, "6 from 10 leaves 4"; in multiplying, "9 times 8 are 72, and 4 are 76"; and in dividing, "12 ÷ 5 = 2 and 2 remaining." Special

stress is laid upon the importance, in performing operations, of dropping all unnecessary words, since the mind reaches results much more rapidly without them.

In factoring, the introduction of a new conception, that of *numbers severally prime* to each other, will be appreciated by experts, and cannot fail to benefit learners, because it obviates the cumbersome expression of numbers by their prime factors. Those who, in dividing fractions, have never practiced mentally the method largely used in Europe, will be delighted with the ease by which results can be obtained.

Attention is called to the presentation of the Metric System. By memorizing the table of submultiples and the table of units, the student acquires the principles of the whole subject, and will only need practice to master it.

Percentage is taught without rules or formulæ, and without the use of the terms *base*, *amount*, and *difference*, although one page is devoted to them after the subject has been completed. The student comes to see clearly that the various exercises in percentage do not need special rules, but are familiar cases slightly modified since the symbol "%" is used instead of *hundredths*. Interest is taught by the 6% method and by the modification of this method in general use among bankers.

The practical exercises "at the lumber yard," "at the carpet store," etc., are to drill the student in methods daily used at such places. Mensuration has been developed with a view of showing the necessity for the existence of the various forms, their relations, and their limitations.

Few principles are presented, but these few are the keys to all departments of the science. Let it be remembered, that he who relies upon thousands of special rules is but a pygmy beside the giant who can apply a score of general principles to millions of particulars.

M. A. BAILEY.

STATE NORMAL SCHOOL OF KANSAS.

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AMERICAN MENTAL ARITHMETIC.

ADDITION.

Addition is indicated by the sign +.

The numbers to be united are *addends;* the result, the *sum* or *amount.*

The sign of equality is =.

The sum of two or more numbers may be found by counting.

Addition is a process shorter than counting for finding the sum of numbers.

A number may be written by the decimal notation or by its addends.

A number may be spelled by naming its addends, just as a word is spelled by naming its letters.

A number may be spelled in several different ways.

ILLUSTRATION.

6 + 4 = 10

read

6 plus 4 equals 10.

6 and 4, *addends.*

10, *sum* or *amount.*

To find the sum of 6 and 4 by counting.

Counting to 6 and making a mark at each count, ////// ; counting to 4 and making a mark at each count, ////// //// ; counting the result, we have 10.

Ten may be written

10; or $\overset{5}{5'}\ \overset{6}{4'}\ \overset{7}{3'}\ \overset{8}{2'}\ \overset{9}{1'}$

Ten, as written above, is spelled *five five, six four, seven three, eight two,* or *nine one.*