ARITHMETIC BY GRADES FOR INDUCTIVE TEACHING, DRILLING AND TESTING. BOOK NUMBER THREE

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JOHN T. PRINCE

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FOR INDUCTIVE TEACHING, DRILLING AND TESTING

BOOK NUMBER THREE

Integers to 1,000,000. Fractional parts of Numbers, United States Money, Weights and Measures, Measurements

PREPARED UNDER THE DIRECTION OF
JOHN T. PRINCE

BOSTON, U.S.A.
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1898

NOTE TO TEACHERS.

THE attention of teachers is called to the following features of this series of books — features which should be kept in mind as the various subjects are presented.

1. The separation of teachers' and pupils' books, whereby pupils may be taught properly and may not be given too great assistance. Suggestions as to methods of teaching and drilling, as well as the illustrative processes, explanations, rules, and definitions which belong to the teacher to develop analytically are put into the Teachers' Manual, while in the pupils' books are presented only such exercises as are needed for practice.

2. The careful gradation of problems, by which pupils acquire inductively a knowledge of arithmetical relations and principles, and skill in arithmetical processes. This is in recognition of the well-known pedagogical principles of proceeding from the known to the unknown, and from the simple to the complex. It is advised that this plan be kept constantly in mind by the teacher, and that whenever a process is not understood or is not readily performed, the pupils should be taken back to processes which are well known and which can be performed readily, and then should be led forward by easy steps until the desired end is reached.

3. Frequent reviews, and such an arrangement of exercises as will enable pupils to have needed practice in the applications of each principle, first by itself, and afterwards in connection with other principles which have been learned.

4. The large amount of oral work, or work which may be done without the aid of figures. Three objects of Mental Arithmetic are sought in these exercises: (*a*) Illustration of principles and a preparation for written work, (*b*) Development of the logical powers, (*c*) Cultivation of ability to work with large numbers by short processes.

5. The great number and variety of problems. The aim has been to give the *largest number* of problems that will be needed for teaching and for drilling in all grades. For this reason, and because the forms of expression are varied, being taken from many sources, there will be no necessity of giving supplementary drill lessons on the blackboard. Blackboard lessons are objectionable not only on account of a waste of the teachers' time and strength, but also on account of the injury done to pupils' eyes in much reading and copying from the blackboard.

6. Practicalness of work in respect to the character of the problems, and the solution of them. Care has been taken to give problems which are most likely to be met in every-day life, and to give them in a practical form. Many of the miscellaneous review problems were made by mechanics, clerks, accountants, etc., with a view of presenting conditions most likely to occur.

7. The introduction of statistics and facts of physics, astronomy, history, geography, etc., thus enabling pupils to gain incidentally much useful information.

8. The use of drill tables and other devices to save the time of teachers.

The first section of this book is given to a review of Book No. 2. If these exercises are found too difficult for pupils, it would be well to review such parts of Book No. 2 as are most needed to give a good foundation for subsequent work.

In developing ideas of numbers to thousands and millions, and of the combinations and relations of those numbers, objects are necessary. The most convenient objects for this purpose are the ordinary splints or wooden tooth-picks. These can be put into bundles of the required size with rubber bands. It is advised that a large number of these splints be supplied to pupils for individual use in the preparation and recitation of lessons.

Drawings also in illustration or explanation of required processes are advised. This exercise will be found especially profitable as well as agreeable for busy work.

For other suggestions and directions in using this book, and for answers to problems, teachers are referred to the Manual for teachers, which is designed to accompany all books of the series.

CONTENTS.

SECTION I.

NUMBERS FROM 1 TO 100. (REVIEW.)

a. 3; 43; 5; 65; 2; 72; 4; 84.
b. 6; 36; 8; 58; 7; 47; 9; 69.
c. 37; 43; 19; 62; 54; 85; 32; 78.
d. 45; 66; 35; 51; 83; 64; 28; 49.

1. Add 4 to each of the above numbers.

2. Add 6. **3.** Add 5. **4.** Add 3.

5. Add 7. **6.** Add 9. **7.** Add 8.

8. Add by columns and lines:

$3+6+7+8+9+7+5=$
$5+9+6+4+3+8+7=$
$9+5+3+9+8+5+6=$
$4+7+5+3+6+8+9=$
$6+2+8+7+5+9+4=$
$5+8+6+8+9+3+7=$
$7+3+9+5+7+6+8=$

9. Add by columns and lines:

$3+5+7+9+8+7+6=$
$9+7+6+6+5+8+3=$
$8+3+7+4+6+9+5=$
$6+5+4+8+9+3+7=$
$7+4+3+9+5+8+6=$
$5+8+9+3+7+6+8=$
$4+7+8+6+5+3+9=$

10. $19+7+8+9+5+7+6+4+8+6+5+7=$
11. $16+5+4+8+9+7+3+6+5+8+4+9=$
12. $13+8+4+9+8+6+5+8+3+7+6+8=$
13. $17+7+3+6+9+6+8+5+7+7+9+3=$
14. $18+4+6+5+8+7+5+9+5+6+5+7=$